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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

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Typical Report Citation and Abstract

❶ **19970001126** NASA Langley Research Center, Hampton, VA USA
❷ **Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes**
❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
❹ Mar. 1996; 130p; In English
❺ Contract(s)/Grant(s): RTOP 505-68-70-04
❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10’ to 50’, and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65’ swept forebody serrations tended to roll together, while vortices from 40’ swept serrations were more effective in generating additional lift caused by their more independent nature.
❽ Author
❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

Key

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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 458)

FEBRUARY 9, 1998

51
LIFE SCIENCES (GENERAL)

19980003947 National Inst. of Environmental Health Sciences, National Toxicology Program, Research Triangle Park, NC USA
Reproductive Toxicity of Lead Acetate Trihydrate (CAS No. 6080-56-4) Administered in Drinking Water to Sprague-Dawley Rats ***Final Report***
Oct. 31, 1996; 417p; In English
Report No.(s): PB97-125371; RACB-94009; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The potential effects of lead acetate trihydrate on the Sprague-Dawley rat reproductive system was evaluated. Phase 1, the Pilot Study, was conducted to confirm similarities of response across laboratories. Phase 2, the Main Study, was conducted to determine if rats acclimatize to some of the effects of lead over a 6-month time frame. For Phase 1, twenty-six male and sixteen female Sprague-Dawley rats/group were administered 0 or 0.3% lead acetate trihydrate in the drinking water for at least 28 days. Clinical observations, body weights, feed and water consumption data were collected. For Phase 2, four hundred male and four hundred female Sprague-Dawley rats were administered 0, 0.025, 0.05, 0.1, and 0.3% lead acetate trihydrate in the drinking water for up to six months. Body weights, food consumption, and water consumption were measured during Study Weeks 1, 4, 8, 12, 16, 20, and 24.
NTIS
Potable Water; Lead Acetates; Reproductive Systems; Toxicity; Reproduction (Biology); Biological Effects

19980004187
Making machine vision work for you
Zuech, Nello, Vision Systems Int., USA; Bartos, Frank J.; Control Engineering; August, 1997; ISSN 0010-8049; Volume 44, no. 11, pp. 44-46, 48; In English; Copyright; Avail: Issuing Activity

Machine vision is executed in many different ways, most popular of which involves the use of a conventional television camera as an input device to collect scene and image data. This information is passed on to a vision computer for processing. The actual processing is application dependent, therefore it is essential to be able to describe the product or process comprehensively to optimize the usage of machine vision. Machine vision is an indispensable tool to add value to process. Gains over the life cycle of a new process line will inevitably far outweigh the cost. to make machine vision work, the working environment should be documented. Cultural issues should also be counted, and a feasibility assessment of a particular application should be done.
EI
Computer Vision; Computer Programs; Computers; Evaluation; Assembling

19980004434
Study of health monitoring systems of linear structures using wavelet analysis
Al-Khalidy, A., Cornell Univ., USA; Noori, M.; Hou, Z.; Carmona, R.; Yamamoto, S.; Masuda, A.; Sone, A.; Division (Publication) PVP. Components; 1997; ISSN 0277-027X; Volume 347, pp. 49-58; In English; 1997 ASME Pressure Vessels and Piping Conference, Jul. 27-31, 1997, Orlando, FL, USA; Copyright; Avail: Issuing Activity

Detection of damage rate in structures caused by low cycle fatigue under dynamic loading such as seismic or wind excitations is of great concern in the structural community. A health monitoring system using wavelet transform has been implemented for detecting the fatigue damage which is modeled as a random impulse in the input signal. In this work, a linear single-degree-of-freedom oscillator is used as a model for the structure. The occurrence time of the impulses has been detected for several signal-to-noise ratios. The detectability of the impulse signal was observed to be affected by the sampling rate, the signal-to-noise ratio,

and the vanishing moments of the wavelets used. Additional noise was introduced in the output response of the system and the detectability of the occurrence time of impulses was again investigated. It turned out that the detectability in general was greatly deteriorated for even very small noise amplitudes specially at high sampling frequencies and was almost lost when the noise level was 10 percent of the output signal. Sampling frequency plays an important and reverse role in the detection of impulsive singularities in the presence or absence of output measurement noise. There is a tradeoff between the sampling rate and detectability depending on the level of signal noise. For low noise level, detectability is improved while increasing the sampling frequency. However, in the case of high output noise, a low sampling rate is suggested.
Author (EI)
Wavelet Analysis; Medical Equipment; Health; Fatigue (Materials); Failure Analysis

19980004455
Pooling of cryoprecipitate
Arantes, Jose C., Univ. of Cincinnati, USA; Telang, Pankaj; Lakshminarayanan, Seshadri; Lin, Alex; International Journal of Industrial Engineering; September, 1997; ISSN 1072-4761; Volume 4, no. 3, pp. 159-166; In English; Copyright; Avail: Issuing Activity

A Blood Bank Center manufactures and supplies cryoprecipitate, a perishable blood derivative to many hospitals. The quantity of cryoprecipitate requested in each order often contains multiple units and is a random variable with a known discrete probabilistic distribution. Currently, the Blood Bank stores cryoprecipitate in bags containing single units of frozen products and whenever an order is placed, these units are taken from the inventory, unfrozen and pooled together so that the requested order quantity can be supplied. The time length of this final preparation may be significant and may have large impact on the quality of the service and of the cryoprecipitate provided.
EI
Biology; Preserving; Random Processes; Probability Theory; Value Engineering; Inventory Controls

19980004629 NASA Johnson Space Center, Houston, TX USA
Development of an Antimicrobial Susceptibility Testing Method Suitable for Performing During Space Flight
Jorgensen, James H., Texas Univ. Health Science Center, USA; Skweres, Joyce A., Krug Life Sciences, Inc., USA; Mishra S. K., Krug Life Sciences, Inc., USA; McElmeel, M. Letticia, Texas Univ. Health Science Center, USA; Maher, Louise A., Texas Univ. Health Science Center, USA; Mulder, Ross, bioMerieux Vitek, Inc., USA; Lancaster, Michael V., Centers for Disease Control, USA; Pierson, Duane L., NASA Johnson Space Center, USA; 1997; 21p; In English
Report No.(s): NASA/CR-97-112973; NAS 1.26:112973; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Very little is known regarding the affects of the microgravity environment of space flight upon the action of antimicrobial agents on bacterial pathogens. This study was undertaken to develop a simple method for conducting antibacterial susceptibility tests during a Space Shuttle mission. Specially prepared susceptibility test research cards (bioMerieux Vitek, Hazelwood, MO) were designed to include 6-11 serial two-fold dilutions of 14 antimicrobial agents, including penicillins, cephalosporins, a Beta-lactamase inhibitor, vancomycin, erythromycin, tetracycline, gentamicin, ciprofloxacin, and trimethoprim/sulfamethoxazole. Minimal inhibitory concentrations (MICS) of the drugs were determined by visual reading of color endpoints in the Vitek research cards made possible by incorporation of a colorimetric growth indicator (alamarBlue(Trademark), Accumed International, Westlake, OH). This study has demonstrated reproducible susceptibility results when testing isolates of Staphylococcus aurezis, Group A Streptococcus, Enterococcusfaecalis, Escherichia coli (beta-lactamase positive and negative strains), Klebsiella pneumoniae, Enterobacter cloacae, and Pseudomoiias aeruginosa. In some instances, the MICs were comparable to those determined using a standard broth microdilution method, while in some cases the unique test media and format yielded slightly different values, that were themselves reproducible. The proposed in-flight experiment will include inoculation of the Vitek cards on the ground prior to launch of the Space Shuttle, storage of inoculated cards at refrigeration temperature aboard the Space Shuttle until experiment initiation, then incubation of the cards for 18-48 h prior to visual interpretation of MICs by the mission's astronauts. Ground-based studies have shown reproducible MICs following storage of inoculated cards for 7 days at 4-8 C to accommodate the mission's time schedule and the astronauts' activities. For comparison, ground-based control (normal gravity) MIC values will be generated by simultaneous inoculation and incubation of a second set of test cards in a laboratory at the launch site. This procedure can provide a safe and compact experiment that should yield new information on the affects of microgravity on the biological activities of various classes of antibiotics.
Author
Bacteria; Pathogens; Microgravity; Antiinfectives and Antibacterials; Spaceborne Experiments; Space Missions; Antibiotics; Staphylococcus; Streptococcus; Tetracyclines

19980004666 Texas Univ. Health Science Center, Baromedical Lab., Houston, TX USA

Study of Hind Limb Tissue Gas Phase Formation in Response to Suspended Adynamia and Hypokinesia ***Final Report***

Butler, Bruce D., Texas Univ. Health Science Center, USA; 1996; 40p; In English

Contract(s)/Grant(s): NCC9-20

Report No.(s): NASA/CR-97-206457; NAS 1.26:206457; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The purpose of this study was to investigate the hypothesis that reduced joint/muscle activity (hypo kinesia) as well as reduced or null loading of limbs (adynamia) in gravity would result in reduced decompression-induced gas phase and symptoms of decompression sickness (DCS). Finding a correlation between the two phenomena would correspond to the proposed reduction in tissue gas phase formation in astronauts undergoing decompression during extravehicular activity (EVA) in microgravity. The observation may further explain the reported low incidence of DCS in space.

Author

Decompression Sickness; Microgravity; Hypokinesia; Muscular Function; Hemodynamic Responses; Weightlessness Simulation

19980004667 California Univ., Office of the Vice Chancellor for Research, Davis, CA USA

Effects of Centrifuge Diameter and Operation on Rodent Adaptation to Chronic Centrifugation ***Final Report***

Fuller, Charles A., California Univ., USA; 1997; 49p; In English

Contract(s)/Grant(s): NAG2-795

Report No.(s): NASA/CR-97-206479; NAS 1.26:206479; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This study examined the responses of rats to centrifugation in a constant acceleration field (1.5 G). Centrifuge diameter (1.8m, 2.5m or 6.0m) and schedule of operation (Daily or weekly stop) varied between groups. Body mass, food consumption, water consumption and neurovestibular function were measured weekly. Body temperature and activity were continuously monitored using telemetry. A subset of subjects were videotaped (50 minutes per day) to allow for movement analysis. Exposure to a hyperdynamic field of this magnitude did cause the expected depression in the physiological variables monitored. Recovery was accomplished within a relatively rapid time frame; all variables returned to precentrifugation levels. In general, the magnitudes of the changes and the rate of recovery were similar at different centrifuge diameters and stopping frequency. There were cases, however, in which the magnitude of the response and/or the rate of recovery to a new steady-state were altered as a result of centrifuge diameter. In summary, these results indicate that stopping frequency has little, if any, effect on adaptation to chronic centrifugation. However, the angular velocity (omega), and therefore centrifuge diameter is an important consideration in the adaptation of an organism to chronic centrifugation.

Derived from text

Physiological Responses; Rodents; Body Temperature; Food Intake; Water Consumption; Telemetry; Centrifuging; Body Fluids

19980004717 Department of Health and Human Services, Public Health Service, Research Triangle Park, NC USA

Toxicology and Carcinogenesis Studies of Tetrafluoroethylene (CAS No. 116-14-3) in F344/N Rats and B6C3F1 Mice (Inhalation Studies), ***series***

Apr. 1997; 309p; In English

Report No.(s): PB97-208508; NIH/PUB-97-3366; NTP-TR-450; No Copyright; Avail: CASI; A14, Hardcopy; A03, Microfiche

Tetrafluoroethylene is used in the production of polytetrafluoroethylene (Teflon) and other polymers. Tetrafluoroethylene was nominated by the National Cancer Institute for toxicity and carcinogenicity studies based on the potential for human exposure to the chemical due to the large production volume and on the lack of adequate data for tetrafluoroethylene in the literature. Male and female F344/N rats and B6C3F1 mice were exposed to tetrafluoroethylene (98% to 99% pure) by whole body inhalation exposure for 16 days, 13 weeks, or 2 years. Genetic toxicity studies were conducted in mouse peripheral blood erythrocytes.

NTIS

Toxicity; Carcinogens

19980004908 Montana State Univ., Dept. of Microbiology, Bozeman, MT USA

Rapid Bacterial Testing for Spacecraft Water ***Final Report***

Lisle, John T., Montana State Univ., USA; Pyle, Barry H., Montana State Univ., USA; McFeters, Gordon A., Montana State Univ., USA; Oct. 1996; 22p; In English

Contract(s)/Grant(s): NAGw-5001

Report No.(s): NASA/CR-96-206364; NAS 1.26:206364; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Evaluations of the fluorogenic stains and probes will continue. E. coli 0157:H7 will be used as the reference strain for optimizing protocols. We anticipate the continued use of the fluorescent antibodies (TRITC and FITC labeled) in conjunction with CTC, Rhl23, DiBAC4(3), DAPI and acridine orange. Chemunex, the manufacturer of the ChemScan analyzer system, also makes a

fluorogenic probe, Chemchrome B, which will be incorporated into the suite of probes to evaluate once their system is on site. Regardless of the combination of stains and probes all will be evaluated on membrane filters. Development of a FISH protocol that will be applicable to our conditions will be continued. Complimentary 16s rRNA probes to Ps. aeruginosa and currently in our laboratory will be evaluated first. Once this protocol has been adequately optimized other probes will be ordered for u a select number of other species. Currently, protocols to evaluate the effects of disinfection and the resulting lethality, injury on stain and/or probe specificity and reliability are being developed. E. coli 0157:H7 is the reference strain and chlorine the disinfectant the reference protocol is being developed around. Upon completion of this work, the resulting protocol will be extended to other species and disinfectants (e.g., iodine). Similar disinfectant experiments will then be conducted on the same species after starvation to evaluate the effects of starvation on disinfection resistance and the applicability of the stains and probes. Development of the immunomagnetic separation system will continue. Combined with the rapid methods described above, with enumeration by the ChemScan, we anticipate that this will provide a highly sensitive technique for the detection of specific, active bacteria.
Derived from text
Bacteria; Water; Evaluation; Chlorine; Aerospace Vehicles

19980004980

Reduction of surface-induced platelet activation on phospholipid polymer

Iwasaki, Yasuhiko, Tokyo Medical and Dental Univ., Japan; Mikami, Asako; Kurita, Kimio; Yui, Nobuhiko; Ishihara, Kazuhiko; Nakabayashi, Nobuo; Journal of Biomedical Materials Research; September 15, 1997; ISSN 0021-9304; Volume 36, no. 4, pp. 508-515; In English; Copyright; Avail: Issuing Activity

omega -Methacryloyloxyalkyl phosphorylcholine (MAPC) polymers which have been synthesized with attention to the surface structure of a biomembrane show excellent blood compatibility, i.e., resistance to protein adsorption and blood cell adhesion. to clarify the stability of platelets in contact with the MAPC polymer surfaces, cytoplasmic free calcium concentration ([Ca(2+)](sub i)) in the platelets was measured. A platelet suspension was passed through a column packed with various polymer beads after treatment with plasma, and the [Ca(2+)](sub i) in the platelets eluted from the column was measured. The [Ca(2+)](sub i) in contact with the MAPC polymers, i.e., poly [2-methacryloyloxyethyl phosphorylcholine-co-n-butyl methacrylate (BMA)] (PMEB) and poly(6-methacryloyloxyhexyl phosphorylcholine-co-BMA) (PMHB), was less than that in contact with poly(BMA). However, poly(10-methacryloyloxydecyl phosphorylcholine-co-BMA) (PMDB) was not effective in suppressing the increase in [Ca(2+)](sub i), and thus was at the same level as in the poly(BMA). This result indicated that platelets in contact with PMEB or PMHB were less activated compared with those in contact with PMDB and poly(BMA). Moreover, the state of the platelets adhered to these polymer surfaces, both morphologically and immunologically, was examined. Scanning electron microscopic observation of the polymer surface after contact with a platelet suspension revealed that many platelets adhered and changed their shape on the poly(BMA). The numbers of adherent platelets were reduced on all MAPC polymer surface. The relative amount of alpha -granule membrane glycoprotein (GMP-140) which appears on the cell membrane by activation of platelets on the PMEB surfaces was less than that on poly(BMA) and poly(2-hydroxyethyl methacrylate). These results suggest that PMEB and PMHB suppressed not only platelet adhesion but also activation of the platelets in contact with these surfaces.
Author (EI)
Lipids; Morphology; Immunology

19980004982

Solubility product of OH-carbonated hydroxyapatite

Ito, Atsuo, MITI, Japan; Maekawa, Kentaro; Tsutsumi, Sadao; Ikazaki, Fumikazu; Tateishi, Tetsuya; Journal of Biomedical Materials Research; September 15, 1997; ISSN 0021-9304; Volume 36, no. 4, pp. 522-528; In English; Copyright; Avail: Issuing Activity

Information on the solubility of OH-carbonated hydroxyapatite, Ca(sub 10)(PO(sub 4))(sub 6)(CO(sub 3))(sub x)(OH)(sub 2 -2x), previously has not been available. In the present study the solubility product (Ksp) of OH-carbonated hydroxyapatite was measured in a 0.1 M acetic acid and sodium acetate buffer solution in a pH range of 4.0-5.8 at a CO(sub 2) partial pressure of 10(sup -3.52) atm. The equilibrium solubility increased with the increase of carbonate content. The Ksp values decreased with the decrease of pH. For example, Ksps were 10(sup -119), 10(sup -123), and 10(sup -130) for pure hydroxyapatite at pH 4.9, 4.5, and 4.1, respectively. The decrease of Ksp was not accounted for by calcium-carbonate complexation. Ksp measured at isoelectric points (L) was expressed as pL = 118.65-0.47316 x (CO(sub 2) wt%)(sup 24176). From this formula, the L values were calculated for pure and fully carbonated hydroxyapatite as 10(sup -118.7) and 10(sup - 102.8), respectively. The L value for pure hydroxyapa-

tite agreed with values measured under carbonate-free conditions. Therefore, the L values were regarded as the Ksp for OH-carbonated hydroxyapatite excluding errors arising from carbonate contamination in the solution.
Author (EI)
Minerals; Phosphates; Solubility; Composition (Property); pH

19980004986
Subcutaneous tissue distribution of vancomycin from a fibrin glue/Dacron graft carrier
Fujimoto, Katsuhiro, Nagoya Univ. Sch. of Medicine, Japan; Yamamura, Keiko; Osada, Takashi; Hayashi, Tetsuo; Nabeshima, Toshitaka; Matsushita, Masahiro; Nishikimi, Naomichi; Sakurai, Tsunehisa; Nimura, Yuji; Journal of Biomedical Materials Research; September 15, 1997; ISSN 0021-9304; Volume 36, no. 4, pp. 564-567; In English; Copyright; Avail: Issuing Activity

We investigated the tissue distribution of vancomycin (VCM) incorporated in fibrin glue (FG) in a rat model. One VCM-loaded FG Dacron graft (VCM-FG, VCM 0.6 mg/graft) was implanted in the subcutaneous tissue of the anterior abdominal wall of each rat. VCM was injected intravenously at an equal dose (0.6 mg/rat) after implantation of one control graft (without VCM-FG). After the implantation and the iv injection of an equal dose of VCM (0.6 mg/rat), the tissue distribution of VCM for up to 24 h was determined through analysis of the implanted VCM-FG grafts, which released VCM over a 24 h period. The area under the VCM concentration-time curve (AUC) of the tissue was 89.58 mu g(center-dot) h/g after the implantation of the VCM-FG graft, and 7.40 mu g(center-dot) h/g after the iv injection of VCM, respectively. The targeting index of the tissue, defined as the ratio of AUC after the implantation of the VCM-FG graft to that after VCM iv injection, was 12.11. None of the six VCM-FG Dacron grafts after implantation became infected following inoculation with S. aureus ATCC 25923 (0.1 mL 10(sup 8) CFU/mL). These results suggest that this VCM-FG Dacron graft delivery may be useful in preventing local infection by enhancing the delivery of VCM to the local areas of the implanted site in rats.
Author (EI)
Dacron (Trademark); Tissues (Biology); Grafting; Implantation; Surgery; Drugs; Physiology

19980004993
Crosslinking density and resorption of dimethyl suberimidate-treated collagen
Charulatha, V., Central Leather Research Inst., India; Rajaram, A.; Journal of Biomedical Materials Research; September 15, 1997; ISSN 0021-9304; Volume 36, no. 4, pp. 478-486; In English; Copyright; Avail: Issuing Activity

Collagen was purified from bovine Achilles tendon and crosslinked with dimethyl suberimidate (DMS) and glutaraldehyde (GTA). Under optimal conditions, the shrinkage temperature (T(sub s)) was raised to 74 C for collagen crosslinked with DMS and to 80 C for those crosslinked with GTA. Crosslinking density measurements were done on the hydrothermally denatured collagen by the method based on the Flory-Rehner equation. GTA treatment was found to introduce more number of crosslinks than DMS. The maximum tension attained during heating (after shrinkage has occurred) was greater for GTA-treated collagen than for DMS and control. The control collagen membranes broke during heating (at 73 C), while for the crosslinked membranes the tension kept on increasing up to 100 C. The crosslinking density correlated well with the data determined from the in vitro and in vivo degradation studies. Uncrosslinked and DMS crosslinked collagen membranes were more susceptible to degradation by enzymes in vitro, while GTA-treated collagen was highly resistant to degradation. The biocompatibility of the collagen membranes was studied by subcutaneous implantation in rats. Uncrosslinked collagen membranes degraded within 14 days with the formation of granulation tissue. DMS crosslinked membranes degraded within 21 days and the area was replaced by numerous fibroblasts and newly formed collagen. No calcification was observed. For GTA-treated membranes, necrosis was observed after 7 days implantation and by 14 days the membrane had started to calcify.
Author (EI)
Methyl Compounds; Collagens; Implantation; Surgery; Crosslinking; Biocompatibility; Biodegradation

19980004996
Detection of interictal epileptic events in EEG using ANN
Khan, Yusuf Uzzaman, Univ. of Oxford, UK; Tarassenko, Lionel; IEE Conference Publication; 1997; ISSN 0537-9989, no. 440, pp. 318-322; In English; Networks, Jul. 7-9, 1997, Cambridge, UK; Copyright; Avail: Issuing Activity

This paper describes a system for the detection of interictal spikes in the EEG using Artificial Neural Networks (ANN). The input layer of the ANN, a multi layer perceptron (MLP), utilizes a feature vector which quantifies slope, sharpness and autoregressive parameters extracted from the EEG every second. There are two classes, namely, normal and epileptic. The MLP classifica-

tion error rates evaluated for two subjects (referred to as A and B) are 6.04% and 7.33% respectively. It is clear, that the problem of subject specificity requires further work.
Author (EI)
Electroencephalography; Neural Nets; Pattern Recognition; Error Analysis; Problem Solving

19980005042
Long-term ingrowth and apposition of porous hydroxylapatite implants
Nunes, C. R., Univ. of Colorado, USA; Simske, S. J.; Sachdeva, R.; Wolford, L. M.; Journal of Biomedical Materials Research; September 15, 1997; ISSN 0021-9304; Volume 36, no. 4, pp. 560-563; In English; Copyright; Avail: Issuing Activity

Bone implant materials are often used to fill in bone gaps that frequently result from orthognathic and craniofacial reconstruction. The substrate hydroxylapatite (HA) is commonly implanted into the bone voids, resulting from these conditions due to its established biocompatibility and osteoconductive properties. The porous structure of HA provides a three-dimensional guideline for fibrovascular ingrowth, facilitating the process that ultimately results in the deposition of new bone. Porous HA (Interpore, 200) implants were implanted in the mandible or maxilla of nine humans and removed after 14-30 months (19.1-month mean). There was no evidence of an inflammatory response. The sample composition and apposition against the implant were determined using point counting and a digitizing tablet and software. Percent ingrowth in available space (%IAS) was defined as %Bone/(%Bone + %Void). A new measure of implant saturation (%IAS - %Apposition of bone) was established to help determine the fundamental manner in which long-term HA implants incorporate bone. In the mean, the samples were composed of 27% bone, 21% void, and 53% implant. The apposition percentages averaged 60% bone, 16% void, and 24% soft tissue. The %IAS averaged 58%, and implant saturation averaged -3%, indicating that a near-balance between the implant and surrounding bone has been established.
Author (EI)
Implantation; Surgery; Minerals; Phosphates; Bones; Biocompatibility; Computer Programs

19980005062
Focus on your Preferred Future
Zalack, Richard G.; Power Transmission Design; August, 1997; ISSN 0032-6070; Volume 39, no. 8, pp. 82-83; In English; Copyright; Avail: Issuing Activity

Our personal life and our work are both a series of choices of activities that we will perform next. The activities that we choose to perform determine our results, our futures. and the choice we have is for a future or for a Preferred Future. The five steps to follow to reach your preferred future are: clear definition of the Preferred Future; knowledge of the importance of this Preferred Future; identification of a small step that will initiate a move; progress monitoring; learning and modification of actions based on what is learned.
EI
Human Factors Engineering; Management Planning; Motivation

19980005232 ROW Sciences, Inc., Gaithersburg, MD USA
Reproductive Toxicity of Methacrylonitrile Administered in Diet to Sprague-Dawley Rats *Final Report*
Wolfe, G. W., ROW Sciences, Inc., USA; Delaney, J. C., ROW Sciences, Inc., USA; May 16, 1997; 514p; In English
Report No.(s): PB97-176390; ROW-Sciences-8989-31; CAS-126-98-7; No Copyright; Avail: CASI; A22, Hardcopy; A04, Microfiche

The potential reproductive toxicity of methacrylonitrile in Sprague-Dawley rats was evaluated using the Reproductive Assessment by Continuous Breeding (RACB) protocol. Based on decreased body weights and feed consumption, increased water consumption, and mortality noted during Task 1, dose levels for the continuous breeding phase for the study were set at 2, 7, and 20 mg/kg in deionized water by oral gavage. Exposure to methacrylonitrile by gavage (20 rats/sex/group) did not affect the reproductive performance of F0 rats (Task 2) or F1 rats (Task 4) where only the controls and high-dose groups were evaluated. In Task 4, estrous cyclicity of the F1 animals was not affected by methacrylonitrile administration. Slight but consistent decreases (3-6%) were noted in the 20 mg/kg F0 male body weights, although none of these reached statistical significance. F0 female body weights were unchanged. Body weights of the F1 20 mg/kg males and females were consistently less (6-10%) than controls and were occasionally statistically significant. Daily mean feed consumption was decreased by 8-11% in the 20 mg/kg F1 males; F0 male and female and F1 female feed consumption values were unchanged.
NTIS
Animals; Breeding (Reproduction); Deionization; Rats; Significance; Statistical Analysis; Toxicity

19980005358 NERAC, Inc., Tolland, CT USA

Microbiology of Groundwater (Latest citations from the Life Sciences Collection Database)

May 1996; In English; Page count unavailable

Report No.(s): PB96-870084; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the occurrence, distribution, activity, and movement of groundwater microorganisms. Detection of microorganisms and their effects upon groundwater quality are also considered.

NTIS

Bibliographies; Ground Water; Microbiology

19980005389 Hospital for Special Surgery, New York, NY USA

Studies of Intercellular Communication and Intracellular Metabolic Responses by Bone Cells to Simulated Weightlessness ***Final Report***

Doty, Stephen B., Hospital for Special Surgery, USA; Dec. 10, 1997; 17p; In English

Contract(s)/Grant(s): NCC2-655

Report No.(s): NASA/CR-97-206494; NAS 1.26:206494; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Spaceflight affects the weight bearing skeletal tissues by reducing the rate of new bone formation. This effect on the long bones of flown rats has been quantitated but the effect at the cellular level and the mechanism(s) involved are not understood. We are applying electron microscopy, coupled with histochemistry and immunocytochemistry to determine the cellular functions most affected by spaceflight. The emphasis for study of these samples from SLS-1, a 9-day mission, is on the histochemical and structural changes of the endosteal and perivascular osteoblasts found in diaphyseal bone of femur and tibia. Work is still in progress but some findings are described: (1) An expected decrease in alkaline phosphatase activity in osteoblasts from flight animals, but an increase in enzyme activity in the stromal stem cells adjacent to the osteoblast. (2) An increase in osteoclastic TRAP activity in the trabecular bone region in response to spaceflight. (3) A large increase in procollagen containing secretory granules in osteoblasts in the recovery group, and a significant decrease in granule numbers in the flight group.

Author

Bones; Histochemical Analysis; Musculoskeletal System; Rats; Space Flight; Cytology; Enzyme Activity; Electron Microscopy

19980005429

PSPMT and photodiode designs of a small scintillation camera for imaging malignant breast tumors

Levin, Craig S., UCLA Sch. of Medicine, USA; Hoffman, Edward J.; Tornai, Martin P.; MacDonald, Lawrence R.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1513-1520; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

We are investigating the concept of utilizing a small gamma ray scintillation camera to help identify and localize malignant breast tumors after a suspicious finding in a mammogram. Excellent sensitivity and specificity for malignant breast tumors has been achieved using conventional nuclear medicine scintillation cameras with certain (sup 99m)Tc labeled radiopharmaceuticals. However, because of the large size, low image resolution and high cost of these devices, they are not ideal for use in breast imaging in a mammography suite. A dedicated miniaturized camera would allow imaging at angles that are physically impossible with the standard camera. These lateral views would not include the background activity from the heart and liver. In addition, with a potentially higher intrinsic resolution, shorter collimator and if breast compression is applied, a small camera could significantly improve the sensitivity and signal to noise ratio for the scintillation imaging method. We are exploring two different photodetector technologies for a small prototype camera development. The first uses a position sensitive photomultiplier (PSPMT) as the photodetector, the second, an array of silicon PIN photodiodes (PD). In this report, we present imaging results obtained with a NaI(TI)-PSPMT design, and the design features, expected performance and relevant energy and position measurements obtained for a test CsI(TI)-PD device.

Author (EI)

Imaging Techniques; Mammary Glands; Photomultiplier Tubes; Radiography; Gamma Rays; Photodiodes; Scintillation

19980005431

Sub-millimeter planar imaging with positron emitters: EGS4 code simulation and experimental results

Bollini, D., INFN Sezione di Bologna, Italy; Del Guerra, D.; Di Domenico, G.; Galli, M.; Gambaccini, M.; Zavattini, G.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1499-1502; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

Experiment data for Planar Imaging with positron emitters (pulse height, efficiency and spatial resolution) obtained with two matrices of 25 crystals (2 x 2 x 30 mm(sup 3) each) of YAP:Ce coupled with a Position Sensitive PhotoMultiplier (Hamamatsu R2486-06) have been reproduced with high accuracy using the EGS4 code. Extensive simulation provides a detailed description of the performance of this type of detector as a function of the matrix granularity, the geometry of the detector and detection threshold. We present the Monte Carlo simulation and the preliminary experimental results of a prototype planar imaging system made of two matrices, each one consisting of 400 (2 x 2 x 30 mm(sup 3)) crystals of YAP:Ce.
Author (EI)
Imaging Techniques; Photomultiplier Tubes; Submillimeter Waves; Positrons; Tomography; Radiography; Monte Carlo Method; Computerized Simulation

19980005432
Design of a high-resolution, high-sensitivity PET camera for human brains and small animals
Moses, W. W., Univ. of California, USA; Virador, P. R. G.; Derenzo, S. E.; Huesman, R. H.; Budinger, T. F.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1487-1491; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

We present design parameters for a 3-D PET camera with high sensitivity (35 cm detector ring diameter, 15 cm axial field of view) and isotropic high resolution provided by detector modules capable of depth of interaction (DOI) measurement. Detector modules are made of LSO crystals (3 mm square by 30 mm deep) - the small module size and short decay time of LSO reduce the detector dead time by a factor of 14 compared to conventional BGO detector modules and narrow the coincidence window width to 4 ns. This yields an expected peak noise equivalent count rate of 800 kcps and noise equivalent sensitivity of 1370 kcps/mu Ci/cc with a 20 cm diameter phantom - three to five times higher than conventional scanners. With 5 mm fwhm DOI resolution, the expected reconstructed spatial resolution is less than 3.0 mm fwhm throughout the entire field of view. Depth of interaction measurement information is incorporated into the reconstruction algorithm by rebinning onto a regularly spaced grid. Attenuation correction is performed with an orbiting singles transmission source.
Author (EI)
High Resolution; Positrons; Tomography; Radiography; Cameras; Brain; Photometers

19980005438
Comparing lesion detection performance for PET image reconstruction algorithms: A case study
Chan, M. T., Univ. of Southern California, USA; Leahy, R. M.; Mumcuoglu, E. U.; Cherry, S. R.; Czernin, J.; Chatziioannou, A.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1558-1563; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

We present a comparison of the performance of filtered backprojection (FBP) and maximum a posteriori (MAP) reconstruction of PET images for the task of hot lesion detection. The comparison is performed on data generated by combining FDG chest scans of normal patients (i.e., without lesions) with pseudo-Poisson 'lesion' data generated from appropriately scaled sinograms collected using a separately scanned 1.25 cm(sup 3) spherical source. Scaling factors were used to achieve approximately 2.5:1 lesion-to-background activity ratios. A total of 60 'abnormal' cases were generated from their normal counterparts. A 3D non-prewhitening (NPW) observer model based on a matched filter was used to test for the presence of the lesion in the vicinity of the known lesion location. ROC curves were generated for several choices of cut-off frequency for ramp-filtered FBP and the smoothing parameter for the MAP reconstructions. The NPW detector was matched to the algorithm and smoothing parameter in each case. Our experiments show that MAP reconstruction over a range of smoothing parameter values results in statistically significant improvements, compared to FBP, for the task of lesion detection using a NPW observer.
Author (EI)
Image Reconstruction; Positrons; Tomography; Radiography; Algorithms

19980005439
Statistical image reconstruction in PET with compensation for missing data
Kinahan, P. E., Univ. of Pittsburgh, USA; Fessler, J. A.; Karp, J. S.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1552-1557; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

We present the results of combining volume imaging with the PENN-PET scanner with statistical image reconstruction methods such as the penalized weighted least squares (PWLS) method. The goal of this particular combination is to improve both classification and estimation tasks in PET imaging protocols where image quality is dominated by spatially-variant system responses and/or measurement statistics. The PENN-PET scanner has strongly spatially-varying system behavior due to its volume imaging

design and the presence of detector gaps. Statistical methods are easily adapted to this scanner geometry, including the detector gaps, and have also been shown to have improved bias/variance trade-offs compared to the standard filtered-backprojection (FBP) reconstruction method. The PWLS method requires fewer iterations and may be more tolerant of errors in the system model than other statistical methods. We present results demonstrating the improvement in image quality for PWLS image reconstructions of data from the PENN-PET scanner.
Author (EI)
Image Reconstruction; Least Squares Method; Positrons; Tomography; Radiography; Statistical Analysis

19980005440
Fourier transform resampling: Theory and application
Hawkins, William G., Picker Int. WHQ, USA; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1543-1551; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

One of the most challenging problems in medical imaging is the development of reconstruction algorithms for nonstandard geometries. The standard geometry is the parallel ray geometry of the conventional Radon transform. This work focuses on the resampling of a nonstandard geometry to obtain a data set in standard geometry. The approach is guided by the application of Fourier analysis to resampling. Fourier Transform Resampling (FTRS) offers potential improvement because the Modulation Transfer Function (MTF) of the process behaves like an ideal low pass filter. Simulated MTF's were obtained by projecting point sources at different transverse positions in the flat fan beam detector geometry. These MTF's were compared to the dosed form expression for FTRS. Excellent agreement was obtained for frequencies at or below the estimated cutoff frequency. The resulting FTRS algorithm is applied to simulations with symmetric fan beam geometry, an elliptical orbit and uniform attenuation, with a normalized root mean square error (NRME) of 0.036. FTRS is also compared to sinc interpolation, and it is shown empirically that the two methods are not equivalent. General expressions are obtained for the transfer function, the MTF, the frequency map, and the resampled antocovariance function. A closed form expression is found for the frequency map associated with the circular arc fan beam geometry.
Author (EI)
Fourier Transformation; Modulation Transfer Function; Root-Mean-Square Errors; Imaging Techniques; Medical Equipment; Image Reconstruction; Algorithms; Transfer Functions

19980005441
Development of a high resolution beta camera for a direct measurement of positron distribution on brain surface
Yamamoto, S., Kobe City Coll. of Technology, Japan; Seki, C.; Kashikura, K.; Fujita, H.; Matsuda, T.; Ban, R.; Kanno, I.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1538-1542; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

We have developed and tested a high resolution beta camera for a direct measurement of positron distribution on the brain surface of animals. The beta camera consists of a thin CaF(sub 2)(Eu) scintillator, a tapered fiber optic plate (tapered fiber) and a position sensitive photomultiplier tube (PSPMT). The tapered fiber is the key component of the camera. We have developed two different sizes of beta cameras. One is 20 mm diameter field of view camera for imaging brain surface of cats. The other is 10 mm diameter camera for that of rats. Spatial resolutions of the beta camera for cats and rats were 0.8 mm FWHM and 0.5 mm FWHM, respectively. We demonstrated that developed beta cameras may overcome the limitation of the spatial resolution of positron emission tomography (PET).
Author (EI)
High Resolution; Photomultiplier Tubes; Positrons; Tomography; Radiography; Cameras; Brain; Phosphors

19980005448
Simple on-line arterial time-activity curve detector for [O-15] water PET studies
Wollenweber, S. D., Univ. of Iowa Hospitals & Clinics, USA; Hichwa, R. D.; Ponto, L. L. B.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1613-1617; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

A simple, automated on-line detector system has been fabricated and implemented to detect the arterial time-activity curve (TAC) for bolus-injection [O-15] water PET studies. This system offers two significant improvements over existing systems: a pump mechanism is not required to control arterial blood flow through the detector and dispersion correction of the time-activity curve for dispersion in external tubing is unnecessary. The [O-15] positrons emanating from blood within a thin-walled, 0.134 cm inner-diameter plastic tube are detected by a 0.5 cm wide by 1.0 cm long by 0.1 cm thick plastic scintillator mounted to a minia-

ture PMT. Photon background is reduced to insignificant levels by a 2.0 cm thick cylindrical lead shield. Mean cerebral blood flow (mCBF) determined from an autoradiographic model and from the TAC measured by 1-second automated sampling was compared to that calculated from a TAC acquired using 5-second integrated manual samples. Improvements in timing resolution (1-sec vs. 5-sec) cause small but significant differences between the two sampling methods. Dispersion is minimized due to small tubing diameters, short lengths of tubing between the radial arterial sampling site and the detector and the presence of a 3-way valve 10 cm proximal to the detector.
Author (EI)
On-Line Systems; Oxygen Isotopes; Positrons; Tomography; Radiography; Hemodynamics; Blood Vessels; Phosphors

19980005449

Utilization of 3-D elastic transformation in the registration of chest X-ray CT and whole body PET

Tai, Yuan-Chuan, UCLA Sch. of Medicine, USA; Lin, Kang Ping; Hoh, Carl K.; Huang, S. C. Henry; Hoffman, Edward J.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1606-1612; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

This paper describes a 3-D elastic transformation which compensates for the non-rigid deformation of the chest that is seen in X-ray CT relative to PET images of the thorax. X-ray CT is widely used for detection and localization of lesions in the thorax. Whole Body PET with 18-FDG is accepted for staging and for measuring tumor response to therapy. The combination of these two modalities to locate metabolically active tumors in CT images should prove to be of significant value in lung cancer staging and treatment planning. Due to the differences in the acquisition conventions and scan duration, the subject's arms are positioned overhead for X-ray CT or at the side for PET, causing a change in the shape of the thorax, requiring non-rigid transformations to achieve proper registration. Techniques to register chest X-ray CT and Whole Body PET images were developed and evaluated. The accuracy of 3-D elastic transformation was tested by phantom study. Studies on patients with lung carcinoma were used to assess the technique for localizing 18-FDG uptake and for correlating PET transmission to X-ray CT images. Results showed that the elastic transformation provided an accurate alignment and reliable correlation of the detailed anatomy of the CT with the functional information of the PET images.
Author (EI)
Computer Aided Tomography; X Rays; Radiography; Positrons; Tomography; Medical Science

19980005451

Nuclear medicine image segmentation using a connective network

Peter, J., Dresden Univ. of Technology, Germany; Freyer, R.; Smith, M. F.; Scarfone, C.; Coleman, R. E.; Jaszczak, R. J.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1583-1590; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

A method for post-reconstruction nuclear medicine image segmentation based on an analogy to the Ising model of a two-dimensional square lattice of N particles (pixels) is presented. A reconstructed 2-D slice image is analyzed as a multi-pixel system where pixels correspond to a 2-D lattice of points with non-zero interaction energy with their nearest neighbors. The model assumes that pixel intensities belonging to the same homogeneous image region are relatively constant, where region intensity means (or labels) are determined by both statistical parameter estimation and deterministic image analysis. The change in value of each pixel during the segmentation process depends on (1) the statistical properties in the reconstructed image and (2) the states of its nearest neighbors. These changes are either in the direction of statistically estimated intensity means or other previously analyzed regions of significance. The segmentation technique uses a new innovative relaxation labeling connective network. The global relaxation dynamics of the network are controlled by the interaction of local synergetic and logistic functions assigned to each pixel. This result may improve the localization of hot and cold regions of interest as compared to the original image.
Author (EI)
Imaging Techniques; Ising Model; Nuclear Medicine; Medical Equipment; Image Processing; Image Reconstruction; Image Analysis

19980005452

Maximum likelihood pixel labeling using a spatially variant finite mixture model

Gopal, S. S., Univ. of Michigan, USA; Hebert, T. J.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1578-1582; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

We propose a spatially-variant mixture model for pixel labeling. Based on this spatially-variant mixture model we derive an expectation maximization algorithm for maximum likelihood estimation of the pixel labels. While most algorithms using mixture

models entail the subsequent use of a Bayes classifier for pixel labeling, the proposed algorithm yields maximum likelihood estimates of the labels themselves and results in unambiguous pixel labels. The proposed algorithm is fast, robust, easy to implement, flexible in that it can be applied to any arbitrary image data where the number of classes is known and, most importantly, obviates the need for an explicit labeling rule. The algorithm is evaluated both quantitatively and qualitatively on simulated data and on clinical magnetic resonance images of the human brain.
Author (EI)
Maximum Likelihood Estimates; Imaging Techniques; Medical Equipment; Image Processing; Mathematical Models; Algorithms; Estimating

19980005471
Preliminary report on kinetic study of blood flow in prostatic cancer using power Doppler imaging
Okihara, Koji, Kyoto Prefectural Univ. of Medicine, Japan; Knazawa, Motohiro; Ushijima, Sou; Azuma, Yutaro; Watanabe, Makoto; Kojima, Munekado; Watanabe, Hiroki; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUO 2918; In English; Copyright; Avail: Issuing Activity

In 1991 (WFUMB'91), we reported the changes of Doppler blood flow signals in patients with prostatic cancer treated by castration. Based upon these studies, it was suggested that the change of blood flow image as well as that of prostatic volume(PV) by using transrectal sonography could offer valuable information in monitoring the therapeutic effects in patients with prostatic cancer after castration. However, details of blood flow changes remained unknown due to the lack of sufficient detectability of blood flows. Recent development of power Doppler imaging has improved much its detectability of blood flows in the prostate. We have analyzed the change of Doppler signals located in cancerous lesions during androgen deprivation therapy since 1996 using power Doppler imaging. The change of Vmax, Vmin and resistive index(RI) on blood flow signals were frequently measured after castration in 7 cases. Pretreatment Vmax ranged from 15.3 to 47.7 (mean: 23.3 cm/s), and RI ranged from 0.56 to 0.84 (mean:O.64). Vmax decreased without exception, and RI also decreased in all cases except one after castration. These results suggest that Vmax and RI might be used as a new parameter of therapeutic effect in patients with prostatic cancer.
Author (EI)
Blood Flow; Imaging Techniques; Hemodynamics; Medical Science; Medical Equipment; Ultrasonics

19980005481
Case of testicular and kidney tumor and multiple pulmonary metastatic lesions
Dodic, M., Inst. of Pulmonary Diseases and TB, CCS, Yugoslavia; Stevic, R.; Atanasijadis, N.; Mandaric, D.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUP 2302; In English; Copyright; Avail: Issuing Activity

The purpose of this paper is the presence of ultrasonographic finding of the patient with a duplex primary carcinoma and pulmonary metastatic lesions. The 27 year's old male was admitted because of multiple pulmonary lesions suspected to hydatid cyst was discovered by chest-X ray. Except indolent cough during last two month, he had no any symptoms. Within the imaging diagnostic procedures US of chest, scrotum and abdomen was made. Preadmission US of the lesions in the chest was a solid, homogenous, hypoechoic well defined mass. This finding excluded hydatid cyst. Percutaneous aspiration biopsy was performed and interpreted as a poorly differentiated carcinoma of unknown origin. After that patient complained of non-tender swelling of right scrotum for a few last months. US examination presented solid, hypoechoic tumor with a deformity of the right testicular capsule and a hydrocele in the scrotum. Pathohistologic analysis evidenced embryonal cell carcinoma. The same finding was confirmed at the second examination of the pulmonary lesions. US of abdomen revealed large, unsharpely defined tumor mass with inhomogenous inner patterns in the upper part of the right kidney. Except that, metastatic thromb in CVI was detected. Pathohistologically, it was adenocarcinoma. The above mentioned ultrasound possibilities further widens the US diagnostic tools on the whole body examinations.
Author (EI)
Pulmonary Lesions; Medical Science; Imaging Techniques; Ultrasonics; Medical Equipment; Diagnosis

19980005484
Extracorpory litotric by closh wave in the tratement of the renoureteral litiasis
Larrea Masdival, Enrique; Vaillant Baralt, Alba; Hernandez Silverio, Damaso; Castillo Rodriguez, Mariano; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUP 2910; In English; Copyright; Avail: Issuing Activity

It was exposed a total of 9.700 cases of renoureteral litiasis treated between April 1986 and January 1993. The ago ranks were from 4 to 89 years. The highest incidence was produced between 24 and 25 years, and a total of 66 cases (0,7%) in less than 15 years. There was predominance of the masculine sex (58%). The 84% of the patient was exclusive treated by ESWL and in the 16% was associated with others procedures (urethroscopy, specialized open surgery, percutany nephre litotomy, percutany neph-

rostomy and double catcter J). The highest % of the cases were in need of an Hospitalary stay from 3 to 7 days and in a little member of cases in ambulatory form. The imagenological studies are fundamentals: to select the cases, to fix precisely technicals transoperatories details, to evaluate the evolution to detect complications and establish the final results. We conclude that the treatment of the renoureteral litiasis by ESWL is a therapeutical modality not invasive and effective.
Author (EI)
Diseases; Medical Services; Surgery

19980005506
Small (less than or = 3 cm) renal parenchymal tumor and fine needle aspiration cytology
Cernelc, Bojana, Clinical Cent. Ljubljana, Slovenia; Perovic, Alenka Visnar; Vidmar, Dubravka Bracika; Simoncic, Maja Podkrajsek; Gorenc, Milan; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUP 2003; In English; Copyright; Avail: Issuing Activity

For the last 3 years we have been performing percutaneous needle aspiration cytology of small solid renal masses (hypoechoic, isoechoic or hyperechoic) in all cases in whom by ultrasonography alone we could not tell whether the process was benign or malignant. In 10 cases cytologic diagnosis of adenocarcinoma was confirmed with histology of the tissue samples taken during surgery; in 5 cases cytologic diagnosis was angiomyolipoma and in one, the bioptic material was acellular. Because of a suspicious appearance of the mass in the latter case, surgery was performed. Histological diagnosis was adenocarcinoma. Fine needle aspiration cytology proved to be a valuable tool for the evaluation of small renal masses.
Author (EI)
Cytology; Diagnosis; Medical Science; Tissues (Biology); Surgery

19980005545
Relationship between zero flow velocity in retinal vessels and + GZ tolerance: A mathematical model approach
Lepoivre, B., G.I.P. Ultrasons Fac Medecine, France; Menigault, E.; Vieyres, P.; Berson, M.; Pourcelot, L.; Clere, J. M.; Tranquart, F.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. OPO 4253; In English; Copyright; Avail: Issuing Activity

The new aircraft pilots are submitted to high acceleration forces which sometimes leads to fatal accidents. Ultrasonic doppler velocity measurements shows that the central visual loss occurs after a cessation of blood velocity. In order to understand the effects of the hypergravity, we have developed a mathematical model of the human cardiovascular system represented by the following elements: the heart preload, the blood flow redistribution, the cardiovascular control processes and the human tolerance. The Stoll curve obtained by our model fits well with the in-vivo data. When Jolt number is low, the minimal tolerance acceleration is + 4.5 Gz. But this minimal tolerance acceleration decreases to only $PLU 3.5 Gz for increasing Jolt number. The time threshold for high acceleration may be explained by the fact that the oxygen pooling in the retina can protect visual performances during several seconds after circulation arrest. Our model shows that the zero flow velocity is only an indicator of possible + Gz intolerance within the few following seconds.
Author (EI)
Flow Velocity; Mathematical Models; Hemodynamics; Ultrasonics; Velocity Measurement; Cardiovascular System; Imaging Techniques; Medical Equipment

19980005546
Hemodynamic change after hemodilution in retinal vein occlusion
Tranquart, F., CHU Bretonneau, France; Arsene, S.; Delaigue, O.; Desbois, I.; Audrerie, Ch.; Rossazza, C.; Pourcelot, L.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. OPO 4254; In English; Copyright; Avail: Issuing Activity

Retinal vein occlusion is a common ophthalmologic vascular disorder in which the involvement of the arterial and/or venous circulation is still unclear. Hemodilution was recently proposed as a possible treatment to improve ocular hemodynamic conditions. Color Coded Doppler (CCD) was used to measure the systolic and diastolic velocities and resistance index (Pourcelot's index) in the central retinal artery (CRA) and the maximum and minimum velocities in the central retinal vein (CRV) of affected eyes and contralateral unaffected eyes in 89 adults (52 men and 37 females; 62.3 +/- 13.9 years) before hemodilution and one day later. Venous blood flow was systematically recorded in all eyes before hemodilution. In central retinal vein occlusion, after hemodilution, a significant improvement in resistance index in ischemic type occlusion and venous velocity was noted in non-ischemic type occlusion. No changes in visual acuity were observed. In branch retinal vein occlusion, no changes in resistance index and visual acuity were observed a significant improvement in venous blood flow velocity was noted in non-ischemic type occlusion. The present results confirm the value of color coded Dopler in the assessment of diagnosis and types of retinal vein occlusion and

to follow the impact of hemodilution on arterial and venous velocity. However, the predictive value of these hemodynamic changes for an improvement in visual acuity remains low.
Author (EI)
Charge Coupled Devices; Hemodynamic Responses; Hemodynamics; Velocity Measurement; Doppler Effect; Imaging Techniques; Medical Equipment; Blood Vessels

19980005547
Ophthalmic artery aneurysms: An investigation by duplex mapping
Molnar, Laszlo, Univ. of Sao Paulo, Brazil; Caldas, Jose G. M. P.; Costa, Vital P.; Cerri, Giovanni; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. OPO 4255; In English; Copyright; Avail: Issuing Activity

To analyze the peak systolic velocity (PSV) in ophthalmic arteries with aneurysm. Color flow duplex mapping (CFDM) was performed in 28 carotid-ophthalmic artery segments without ipsilateral carotid stenosis. The angiographic study of the extracranial and intracranial carotid system was utilized as the 'gold standard'. A subgroup of eight ophthalmic arteries with aneurysms from seven individuals were identified with PSVs significantly reduced mean PSVs compared with the mean PSVs in the normal group ($p = 0.006$). A PSV of less than 19 cm/s offered a sensitivity of 80% and a specificity of 100% in diagnosing ophthalmic artery aneurysms. CFDM is useful in the identification of patients with ophthalmic artery aneurysms and without severe ipsilateral carotid stenosis.
Author (EI)
Flow Distribution; Hemodynamics; Angiography; Blood Vessels; Ophthalmology; Velocity

19980005563
In-vitro validation of paediatric cardiac output measurements using the spherical colour Doppler method
Chew, Michelle S., Aarhus Univ. Hospital, Denmark; Poulsen, J. Kristian; Sloth, Erik; Hasenkam, J. Michael; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. PEO 5802; In English; Copyright; Avail: Issuing Activity

The spherical color Doppler method of cardiac output (CO) measurement is a new technique based on color Doppler velocity sampling across a spherical surface. Independent of angle of insonation and blood flow-velocity profiles, this method offers promise over older methods of Doppler flow measurements. This is particularly important in the paediatric setting where there is currently no reliable tool for measuring CO. We tested the accuracy of the technique in-vitro, acquiring data with a 7.5 MHz paediatric multiplane transoesophageal probe. 10 flow rates (12 to 110 ml/sec), 2 vessel sizes (19 and 11 mm) and 2 insonation angles were investigated, using 12 scan planes to make up the skeleton of a spherical surface. There was good correlation with true flow ($r = 0.948$ to 0.995), and narrow limits of agreement. Accuracy was clearly poor at high flowrates when the Nyquist velocity was reached. For flow values under this limit, the error reached + 6.94%. This study demonstrates the ability of the spherical color Doppler technique in measuring CO in-vitro. This we find this method holds promising potentials for clinical CO measurements in children.
Author (EI)
Cardiac Output; Echocardiography; Imaging Techniques; Medical Equipment; Color; Image Processing; Doppler Effect; Medical Science

19980005569
Proceedings of the 1996 Medical Imaging Conference, MIC
IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1; 131p; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

The proceedings contains 22 papers from the 1996 Medical Imaging Conference. Topics discussed include: positron emission tomography; brain imaging; gamma cameras; heavy-ion tumor therapy; mammography; tumor imaging; multiple line source attenuation maps; single photon emission computerized tomography; position sensitive photomultiplier tubes; photodiodes; Fourier transform resampling; statistical image reconstruction; lesion detection; contiguous volume analysis; image analysis; maximum likelihood pixel labeling; nuclear medicine; filtered backprojection reconstruction; X-ray computerized tomography; and scintillation cameras.
EI
Computer Aided Tomography; Imaging Techniques; Photomultiplier Tubes; X Rays; Medical Equipment; Positrons; Tomography; Radiography; Nuclear Medicine

19980005676

Chlorinated structures in high molecular weight organic matter isolated from fresh and decaying plant material and soil

Flodin, Carina, Linkoping Univ., Sweden; Johansson, Emma; Boren, Hans; Grimvall, Anders; Dahlman, Olof; Morck, Roland; Environmental Science and Technology; September, 1997; ISSN 0013-936X; Volume 31, no. 9, pp. 2464-2468; In English; Copyright; Avail: Issuing Activity

During the past few years, surveys of AOX (adsorbable organic halogens) in water and TOX (total amount of organic halogens) in soil have demonstrated that natural halogenation of organic macromolecules is responsible for the widespread occurrence of organohalogens in seemingly unpolluted environments. This study revealed the presence of several chlorinated aromatic structures in organic matter derived from different types of decaying plant material and soil. In samples derived from fresh plant matter, however, there was normally no evidence of such structures. Two types of samples were analyzed: (i) lignin materials isolated by acidic solvolysis of fresh and decaying spruce wood, birch leaves, peat moss (Sphagnum), and meadow grass and (ii) high molecular weight organic matter leached with base from spruce forest soil and meadow grass soil. An oxidative degradation technique was used to render the studied structures amenable to gas chromatography with atomic emission detection (GC-AED) and mass spectrometric detection (GC-MS). The identified degradation products were methyl esters of 3-chloro- and 3,5-dichloro-4-ethoxybenzoic acid, 5-chloro-4-ethoxy-3-methoxybenzoic acid, dichloro- and trichlorobenzoic acids, and 3,5-dichloro-4-methoxybenzoic acid.

Author (EI)

Gas Chromatography; Molecular Weight; Organic Materials; Chlorine Compounds; Decay; Oxidation; Halogenation

19980005725

Dynamics of Pseudomonas aeruginosa azurin and its Cys3Ser mutant at single-crystal gold surfaces investigated by cyclic voltammetry and atomic force microscopy

Friis, Esben P., Technical Univ. of Denmark, Denmark; Andersen, Jens E. T.; Madsen, Lars L.; Bonander, N.; Moller, Per; Ulstrup, Jens; Electrochimica Acta. Structure, Electrical Properties, Electrochemical Reactivity; July 23, 1997; ISSN 0013-4686; Volume 42, no. 19, pp. 2889-2897; In English; 1996 1st Baltic Conference on Interfacial Electrochemistry, Jun. 14-18, 1996, Tartu, Estonia; Copyright; Avail: Issuing Activity

Cyclic voltammetry of Pseudomonas aeruginosa azurin on polycrystalline gold is reversible (E(sup 0) = 360 mV vs she; 50 mM ammonium acetate) but the voltammetric signals decay with time constants of about 3 x 10(sup -3) s(sup -1). No signal is observed for monocrystalline Au(111). Cys3Ser azurin is electrochemically inactive on either type of gold electrode but shows a reversible although decaying peak (362 mV, 50 mM ammonium acetate; decay time constant approximately = 2 x 10(sup -3) s(sup -1)) on edge-plane pyrolytic graphite. Ex situ and in situ atomic force microscopy (AFM) of the azurins on Au(111) show initially arrays of protein structures of lateral 100-200 angstroms and vertical approximately = 50 angstroms extension. These could be individual molecular images convoluted with the tip curvature. As scanning proceeds the structures in the ex situ mode collect into large two-dimensional assemblies while the adsorbed protein in the in situ mode is largely swept into the solution, recovering the free Au(111) surface. The cyclic voltammetry and AFM data are consistent with time dependent adsorption of the azurins on gold via the disulphide bridge (wild-type) or free thiol group (Cys3Ser mutant).

Author (EI)

Atomic Force Microscopy; Single Crystals; Bacteria; Voltmeters; Gold; Electrochemistry; Electrodes

19980005751

Novel feeding strategy for enhanced plasmid stability and protein production in recombinant yeast fedbatch fermentation

Cheng, Chinyuan, Ohio State Univ., USA; Huang, Yu Liang; Yang, Shang-Tian; Biotechnology and Bioengineering; October 05, 1997; ISSN 0006-3592; Volume 56, no. 1, pp. 23-31; In English; Copyright; Avail: Issuing Activity

A novel feeding strategy in fedbatch recombinant yeast fermentation was developed to achieve high plasmid stability and protein productivity for fermentation using low-cost rich (non-selective) media. In batch fermentations with a recombinant yeast, Saccharomyces cerevisiae, which carried the plasmid pSXR125 for the production of beta -galactosidase, it was found that the fraction of plasmid-carrying cells decreased during the exponential growth phase but increased during the stationary phase. This fraction increase in the stationary phase was attributed to the death rate difference between the plasmid-free and plasmid-carrying cells caused by glucose starvation in the stationary phase. Plasmid-free cells grew faster than plasmid-carrying cells when there were plenty of growth substrate, but they also lysed or died faster upon the depletion of the growth substrate. Thus, pulse additions of the growth substrate (glucose) at appropriate time intervals allowing for significant starvation period between two consecutive feedings during fedbatch fermentation should have positive effects on stabilizing plasmid and enhancing protein production. A selective medium was used to grow cells in the initial batch fermentation, which was then followed with pulse feeding of concentrated non-selective media in fedbatch fermentation. Both experimental data and model simulation show that the periodic glucose

starvation feeding strategy can maintain a stable plasmid-carrying cell fraction and a stable specific productivity of the recombinant protein, even with a non-selective medium feed for a long operation period. On the contrary, without glucose starvation, the fraction of plasmid-carrying cells and the specific productivity continue to drop during the fedbatch fermentation, which would greatly reduce the product yield and limit the duration that the fermentation can be effectively operated. The new feeding strategy would allow the economic use of a rich, non-selective medium in high cell density recombinant fedbatch fermentation. This new feeding strategy can be easily implemented with a simple IBM-PC based control system, which monitors either glucose or cell concentration in the fermentation broth.
Author (EI)
Fermentation; Enzymes; Yeast; Cells (Biology); Culture Techniques; Kinetics

19980005752
Substrate limitation in the Baculovirus Expression Vector System
Radford, Kathryn M., Geneva Biomedical Research Inst., Switzerland; Reid, Steven; Greenfield, Paul F.; Biotechnology and Bioengineering; October 05, 1997; ISSN 0006-3592; Volume 56, no. 1, pp. 32-44; In English; Copyright; Avail: Issuing Activity

The inability to infect insect cell cultures at the highest achievable cell densities has imposed major limitations to both the fundamental understanding of the Baculovirus Expression Vector System (BEVS) as well as full exploitation of its potential productive capacity for recombinant (beta -galAcNPV) products. The current literature does not characterize and identify the exact nature of the observed limitations, which therefore has become the major objective and contribution of the following study. Critical densities for infection of Spodoptera frugiperda (Sf9) cells with nuclear polyhedrosis virus expressing beta -galactosidase (Autographa californica) grown in media both containing fetal calf serum (FCS) and free of serum were found to be at 2 x 10(sup 6) and 5 x 10(sup 6) cells/ml respectively. Medium exchange was found to completely reverse the effect if renewed up to 24 hours post-infection (HPI). The inevitable arrest of uninfected cell growth and decreased production of recombinant products at high cell densities of infection were both correlated to nutrient depletion. Cystine was found to be depleted in uninfected insect cell cultures at the onset of the stationary phase and in serum-free insect cell cultures infected with baculovirus above a cell density of 5 x 10(sup 6) cells/ml. Neither glucose depletion nor accumulation of possible inhibitory metabolites such as alanine, ammonia, or lactate could be correlated to growth arrest or decreased recombinant product yields.
Author (EI)
Infectious Diseases; Animals; Cells (Biology); Culture Techniques; Bacteriophages; Enzymes; Kinetics; Substrates

19980005753
One step purification of chymosin by mixed mode chromatography
Burton, S. C., Massey Univ., New Zealand; Haggarty, N. W.; Harding, D. R. K.; Biotechnology and Bioengineering; October 05, 1997; ISSN 0006-3592; Volume 56, no. 1, pp. 45-55; In English; Copyright; Avail: Issuing Activity

Mixed mode Sepharose and Perloza bead cellulose matrices were prepared using various chemistries. These matrices contained hydrophobic (aliphatic and/or aromatic) and ionic (carboxylate or alkylamine) groups. Hydrophobic amine ligands were attached to epichlorohydrin activated Sepharose (mixed mode amine matrices). Hexylamine, aminophenylpropanediol and phenylethylamine were the preferred ligands, on the basis of cost and performance. Other mixed mode matrices were produced by incomplete attachment (0-80%) of the same amine ligands to carboxylate matrices. The best results were obtained using unmodified or partially ligand-modified aminocaproic acid Sepharose and Perloza. High ligand densities were used, resulting in high capacity. Furthermore, chymosin was adsorbed at high and low ionic strengths, which reduced sample preparation requirements. Chymosin, essentially homogeneous by electrophoresis, was recovered by a small pH change. The methods described were simple, efficient, inexpensive and provided very good resolution of chymosin from a crude recombinant source. The carboxylate matrices had the best combination of capacity and regeneration properties. The performance of Sepharose and Perloza carboxylate matrices was similar, but higher capacities were found for the latter. Because it is cheaper and can be used at higher flow rates, Perloza should be better suited to large scale application. High capacity chymosin adsorption was found with carboxymethyl ion exchange matrices, but low ionic strength was essential for adsorption and the purity was inferior to that of the mixed mode matrices.
Author (EI)
Enzymes; Purification; Carboxylic Acids; Adsorption

19980005754

Determination of cells' water membrane permeability: Unexpected high osmotic permeability of Saccharomyces cerevisiae

de Maranon, I. Martinez, ENSBANA, France; Gervais, P.; Molin, P.; Biotechnology and Bioengineering; October 05, 1997; ISSN 0006-3592; Volume 56, no. 1, pp. 62-70; In English; Copyright; Avail: Issuing Activity

Water permeability (Lp), calculated from the volume variations of cells subjected to an osmotic shock, is classically used to characterize cell membrane properties. In this work, we have shown the importance of the kind of mixing reactor used to measure the Lp parameter. A mathematical model including the mixing time constant has been proposed allowing an accurate Lp estimation even though the mixing time constant is higher than the cell time constant obtained in response to a perfect shock. The estimated Lp values of human leukemia K562 cells were found to be the same whatever the mixing time constant. The Lp value of Saccharomyces cerevisiae could not be exactly estimated. However, S. cerevisiae has unexpectedly high water permeability, implying that this yeast may contain water channels in the membrane.

Author (EI)

Time Constant; Osmosis; Membranes; Yeast; Cells (Biology); Culture Techniques; Bioreactors

19980005755

Optimization and scale-up of solvent extraction in purification of hepatitis A virus (VAQTA)

Hagen, Anna J., Merck Research Lab., USA; Oliver, Cynthia N.; Sitrin, Robert D.; Biotechnology and Bioengineering; October 05, 1997; ISSN 0006-3592; Volume 56, no. 1, pp. 83-88; In English; Copyright; Avail: Issuing Activity

Solvent extraction is a very powerful purification step in the preparation of VAQTA, a highly purified, inactivated hepatitis A vaccine. Extraction of an aqueous product-containing protein solution with chloroform through vigorous shaking causes irreversible denaturation of contaminant proteins at the interface. However, the hepatitis A virus (HAV) remains viable and soluble in the aqueous phase. Because three phases (air, aqueous, and organic) are involved, and the mixing is carried out in individual bottles, there is very little theory available to characterize this process, so it must be studied experimentally. This extraction step was characterized by following the removal of a specific impurity from the aqueous phase as a representative marker for the degree of protein precipitation. These experiments led to the identification and optimization of the important variables controlling the extraction step. They were found to be mixing time and size of vessel, with longer mixing times resulting in higher purity and larger bottle size leading to faster kinetics of impurity removal. These parameters are most likely related to solvent/aqueous interfacial area and the resulting shear due to shaking. We conclude that, to scale up this type of mixing, the kinetics of impurity removal need to be determined experimentally for the systems and equipment under consideration.

Author (EI)

Solvent Extraction; Vaccines; Purification; Viruses; Proteins

19980005757

Experimental investigation and modeling of oscillatory behavior in the continuous culture of Zymomonas mobilis

Daugulis, Andrew J., Queen's Univ., Canada; McLellan, P. James; Li, Jinghong; Biotechnology and Bioengineering; October 05, 1997; ISSN 0006-3592; Volume 56, no. 1, pp. 99-105; In English; Copyright; Avail: Issuing Activity

The mechanism causing oscillation in continuous ethanol fermentation by Zymomonas mobilis under certain operating conditions has been examined. A new term, 'dynamic specific growth rate,' which considers inhibitory culture conditions in the recent past affecting subsequent cell behavior, is proposed in this article. Based on this concept, a model was formulated to simulate the oscillatory behavior in continuous fermentation of Zymomonas mobilis. Forced oscillation fermentation experiments, in which exogenous ethanol was added at a controlled rate to generate oscillatory behavior, were performed in order to obtain estimates for the model parameters and to validate the proposed model. In addition, data from a literature example of a sustained oscillation were analyzed by means of the model, and excellent agreement between the model simulation and experimental results was obtained. The lag in the cells' response to a changing environment, i.e., ethanol concentration change rate experienced by the cells, was shown to be the major factor contributing to the oscillatory behavior in continuous fermentation of Zymomonas mobilis under certain operating conditions.

Author (EI)

Microorganisms; Cells (Biology); Culture Techniques; Fermentation; Ethyl Alcohol; Kinetics

19980005758

Modeling assembly, aggregation, and chaperoning of immunoglobulin G production in insect cells

Whiteley, Erik M., Johns Hopkins Univ., USA; Hsu, Tsu-An; Betenbaugh, Michael J.; Biotechnology and Bioengineering; October 05, 1997; ISSN 0006-3592; Volume 56, no. 1, pp. 106-116; In English; Copyright; Avail: Issuing Activity

A model for immunoglobulin G (IgG) production in the baculovirus-insect cell system was developed that incorporates polypeptide synthesis, oligomer assembly, protein aggregation, and protein secretion. In addition, the capacity of a chaperone to protect heavy and light chain polypeptides from protein aggregation was considered by including in vitro chaperone-peptide binding and dissociation kinetic constants from the literature. Model predictions were then compared to experiments in which the chaperone immunoglobulin heavy chain binding protein, BiP, was coexpressed by coinfecting insect cells with BiP-containing baculovirus. The model predicted a nearly twofold increase in intra-cellular and secreted IgG that was similar to the behavior observed experimentally after approximately 3 days of coexpressing heterologous IgG and BiP. However, immunoglobulin aggregation was still significant in both the model simulation and experiments, so the model was then used to predict the effect of strategies for improving IgG production even further. Increasing expression of the chaperone BiP by 10-fold over current experimental levels provided a 2.5-fold increase in secreted IgG production over IgG assembly without BiP. Alternatively, the expression of BiP earlier in the baculovirus infection cycle achieved a twofold increase in protein secretion without requiring excessive BiP production. The potential effect of cochaperones on BiP activity was considered by varying the BiP binding and release constants. The utilization of lower binding and release kinetic constants led to a severalfold increase in IgG secretion because the polypeptides were protected from aggregation for greater periods. An optimized strategy for chaperone action would include the rapid peptide binding of a BiP-ATP conformation along with the slow peptide release of a BiP-ligand conformation. However, even with an optimized chaperoning system, limitations in the secretion kinetics can result in the accumulation of intracellular IgG. Thus, the entire secretory pathway must be considered when enhanced secretion of heterologous proteins is desired.
Author (EI)
Antibodies; Animals; Cells (Biology); Culture Techniques; Computerized Simulation; Polypeptides; Biosynthesis

19980005793
Effects of iterative versus filtered backprojection reconstruction on kinetic modeling
Schiepers, Christiaan, Univ. of Leuven, Belgium; Nuyts, Johan; Wu, Hsiao-Ming; Verma, Ramesh C.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1591-1593; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

High focal uptake in patients poses particular problems in PET imaging. Filtered backprojection (FBP) introduces disturbing streak artifacts, adversely affecting the identification of structures and delineation of regions. Iterative reconstruction methods (MLEM) provide images of superb quality, however, the accuracy of quantitative results obtained from MLEM images has not been established for clinical data. Dynamic images were acquired over 1 hr with PET and (sup 18)F-fluoride in 6 patients with an old unilateral hip fracture. FBP and MLEM reconstruction was performed. Since the bladder was in the FOV and filled up with fluoride, FBP produced streaks hampering region delineation. Bone blood flow (k1) and fluoride influx rate (Ki) were estimated with a 3 compartment model. Analyzed regions (n = 190) showed correlation coefficients between FBP and MLEM: 0.88 for k1 and 0.97 for Ki. Affected and normal femoral head regions (n = 30) yielded r = 0.89 for k1 and r = 0.95 for Ki. Variations up to 46% were seen in individual data. Conclusion: in patients MLEM provides superior images at the expense of an increased reconstruction duration. Our procedure appeared acceptable in clinical routine. Quantitative estimates obtained with kinetic modeling from MLEM data were reliable and correlated highly to those obtained with the standard, validated FBP algorithm.
Author (EI)
Radiography; Positrons; Tomography; Image Reconstruction; Iterative Solution; Radioactive Isotopes

19980005794
Quantitative 3D data extraction using contiguous volumes
Dykstra, C. J., Div. of Nuclear Medicine, Canada; Harrop, R.; Celler, A. M.; Atkins, M. S.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1571-1577; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

A new image analysis method, called contiguous volume analysis, has been developed to automatically extract 3D information from emission images. The method considers volumes of activity and displays data about them in a format which allows quantitative image comparison. This method of numerical analysis enables us to show, for example, whether or not information has been gained, lost or changed through the use of different filters and different attenuation and scatter correction, and reconstruction algorithms. Since the analysis method is consistent with a visual inspection of the data, intuitive insights into the meaning of the data are possible, allowing a better understanding of the effects of the different image processing techniques on the images. The method can be used to find patterns of activity in sets of images, and may be used to quantify noise, allowing an objective determination of which volumes in an image are meaningful.
Author (EI)
Radiography; Positrons; Tomography; Computer Aided Tomography; Image Analysis; Numerical Analysis

19980005795

Original emission tomograph for in vivo brain imaging of small animals

Valda Ochoa, A., Universite de Paris 11, France; Ploux, L.; Mastrippolito, R.; Charon, Y.; Laniece, P.; Pinot, L.; Valentin, L.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1533-1537; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

The principle of a new tomograph (TOHR) dedicated for small volume analysis with very high resolution is presented in this paper. We use uncorrelated multi-photon (X or gamma rays) radioisotopes and a large solid angle focusing collimator to produce tomographic images without a reconstruction algorithm. With this device, detection efficiency and resolution are independent and submillimeter resolution can be achieved. A feasibility study shows that collimators made with a stack of chemically etched plates can achieve the predicted performances of TOHR. We discuss its potential in rat brain tomography by simulating a realistic neuropharmacological experiment using a 1.4 mm resolution prototype of the TOHR under development.

Author (EI)

Imaging Techniques; Radioactive Isotopes; Radiography; Image Resolution; Brain; Collimators

19980005796

Non-rigid summing of gated PET via optical flow

Klein, G. J., Univ. of California, USA; Reutter, B. W.; Huesman, R. H.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1509-1512; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

A method for summing together datasets from gated cardiac PET acquisitions is described. Optical flow techniques are used to accurately model non-rigid motion present during the cardiac cycle so that a one-to-one mapping is found between each voxel of two gated volumes. Using this mapping, image summing can take place, producing a composite dataset with improved statistics and reduced motion-induced blur. Results using data from a gated cardiac study on a dog are presented.

Author (EI)

Positrons; Tomography; Radiography; Optical Flow (Image Analysis); Image Processing; Cardiology

19980005797

In-beam PET imaging for the control of heavy-ion tumour therapy

Pawelke, J., Inst. fuer Kern- u. Hadronenphysik, Germany; Enghardt, W.; Haberer, Th.; Hasch, B. G.; Hinz, R.; Kraemer, M.; Lauckner, K.; Sobiella, M.; IEEE Transactions on Nuclear Science; August, 1997; ISSN 0018-9499; Volume 44, no. 4 Pt 1, pp. 1492-1498; In English; 1996 Medical Imaging Conference, MIC, Nov. 7-9, 1996, Anaheim, CA, USA; Copyright; Avail: Issuing Activity

A method for the in-situ control of the heavy-ion tumour therapy by means of positron emission tomography is introduced. This method is founded on the measurement of the dynamic spatial distributions of beta(sup +)-emitters generated by nuclear fragmentation during the irradiation and their relation to the dose. In order to study this relationship and to derive the dose distribution from the measured beta(+)-activity distribution, a framework of model calculations is used. Results of phantom experiments with (sup 12)C ion beams will be presented, demonstrating good agreement between experiment and calculation as well as the possibilities and limits of the PET-technique for treatment plan verification and beam monitoring.

Author (EI)

Imaging Techniques; Positrons; Tomography; Radiography; Medical Science; Radiation Therapy; Dosimeters

19980005835

Mapping of oxygen tension and cell distribution in a hollow-fiber bioreactor using magnetic resonance imaging

Williams, Shane N. O., Univ. of Cambridge, UK; Callies, Rainer M.; Brindle, Kevin M.; Biotechnology and Bioengineering; October 05, 1997; ISSN 0006-3592; Volume 56, no. 1, pp. 56-61; In English; Copyright; Avail: Issuing Activity

We mapped the distribution of dissolved oxygen and mammalian cells in a hollow-fiber bioreactor (HFBR) using (sup 19)F NMR T(sub 1) relaxation time imaging measurements on an infused perfluorocarbon probe molecule and diffusion-weighted (sup 1)H NMR imaging of water. This study shows how cell density influences dissolved oxygen concentration in the reactor and demonstrates that NMR can play an important role in defining the biochemical engineering parameters required for optimization of HFBR design and operation.

Author (EI)

Imaging Techniques; Magnetic Resonance; Oxygen Tension; Bioreactors; Magnetic Measurement; Animals; Cells (Biology); Culture Techniques; Oxygen

19980006032

Hemodynamic changes in intrahepatic portal vessels after percutaneous ethanol injection of hepatocellular carcinoma under general anesthesia

Tarantino, L., D. Cotugno Hospital, Italy; Giorgio, A.; Perrotta, A.; Aloisio, V.; Forestieri, M. C.; Tamasi, S.; Canadeo, M.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1412; In English; Copyright; Avail: Issuing Activity

Thrombosis of intrahepatic portal vessels (IPV) and ischemic necrosis of liver parenchyma after percutaneous ethanol injection (PEI) of Hepatocellular Carcinoma (HCC) have been reported. Aim of this study was to evaluate intrahepatic hemodynamic changes that can occur after this therapy. Patients and methods: We studied 90 patients (72 male; age 42-80) with 128 HCC nodules (52 patients, with 1, 38 patients with 2-4 nodules) underwent 102 sessions of PEI under general anesthesia (u.g.a). Amount of ethanol injected per session ranged 7-70 ml (mean: 29 ml). A baseline echo-color-doppler the day before treatment and a control examination within 6-10 days after the treatment were performed on all fasting patients and in supine position. Patency and blood flow direction were evaluated in main, right and left portal vein, in segmental portal vessels and in hepatic veins. Baseline echo-doppler examination showed: absence of thrombosis in all patients; hepatopetal flow in IPV in 83/90 patients; reverse flow in the segmental portal branch related to the segment were the tumor were located (VII and VI respectively) in 3/90 (3.4%) patients; patency of paraumbilical vein with hepatofugal flow in 11/90 (12.2%) patients; continuous flow in hepatic veins in 68/90 (75.5%) patients and triphasic flow pattern in 22. The post-treatment echo-color-doppler showed: partial non neoplastic thrombosis (proved by fine needle biopsy) of right portal vein in 3 patients; reverse flow in the segmental portal branch related to the segment were the treated tumor were located in 12/90 (11.1%; 9 more than before PEI treatment). In 2 cases there were clear evidence of periferic artero-portal shunt at echo-color-doppler. In 4 cases RF was present in all the portal vessels of the lobe were the treated tumor was located. In two of them echo-color doppler showed reverse flow in right portal vein, in all portal vessels of the right lobe and in segmental portal vessels of the left lobe together with hepatopetal flow in main portal vein and in left portal vein which drained in a large patent paraumbilical vein with hepatofugal flow; both patients showed worsening of liver function and one of them started showing a severe liver failure 3 days after the treatment and died 7 days later. The other two patients showed RF in all portal vessels of the left lobe which drained through the right portal vein. In all remaining patients echo-color-doppler did not show any change in hepatic vein flow and in portal vessels. PEI of HCC can cause reverse flow in intrahepatic portal vessels probably due to diffuse thrombosis of the thin intralobular vessels or periferic portal vessels. Moreover, already pre-existing peritumoral and/or intrahepatic (cirrhosis-related) artero-portal shunts can play a role.

Author (EI)

Ethyl Alcohol; Hemodynamic Responses; Hemodynamics; Doppler Effect; Anesthetics; Blood Vessels

19980006033

Percutaneous ethanol injection under general anesthesia of hepatocellular carcinoma on cirrhosis: Three years survivals in 107 patients

Giorgio, A., D. Cotugno Hospital, Italy; Tarantino, L.; Mariniello, N.; de Stefano, G.; Perrotta, A.; Aloisio, V.; Forestieri, M. C.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1413; In English; Copyright; Avail: Issuing Activity

Percutaneous ethanol injection (PEI) under general anesthesia (u.g.a.) is a new therapy for treatment of large and/or multiple Hepatocellular Carcinoma (HCC). We report our results with 3 years survival rates in patients with HCC on cirrhosis treated with PEI u.g.a. Patients and methods: between October 1992 and December 1995, 112 cirrhotic patients (79 male; age: 45-80; mean: 64 years) with 215 HCC nodules (diam. = 0.6-14 cm; mean: 4.1 cm; median: 3.5 cm) underwent PEI u.g.a. 53 patients had one nodule (diam. = 3-14 cm; mean = 4.2 cm; median = 3.5 cm), 59 had 2 or more (2-5) nodules (diam. = 0.6-13 cm; mean = 3.9; median = 3.5 cm). Total ethanol injected per treatment ranged between 16-205 cc. Survival rates and statistical analysis were calculated according to Kaplan-Meier method and Wilcoxon test respectively. 5 patients died within 7 hours-10 days after the treatment for rupture of aesophageal varices in 3 cases, rupture of subcapsular HCC in 1 case and liver failure in 1 case. In the remaining 107 patients, dynamic CT, performed 72 hours-one month after the treatment, showed complete necrosis in 76 (71%) cases and incomplete necrosis (although always greater than 50%) in 31. Survival rates at 1, 2, 3 years in all 107 patients were 88%, 76% and 76% respectively. Survival rates in Child class A patients were 100%, 92%, 92% and in class B patients were 84%, 72% e 72% at 1, 2, 3 years respectively; in class C were 100% e 50% at 1 and 2 years respectively (p = n.s.). Survival rates in patients with one nodule were 80%, e 68% at 1 and 2 years, while in the patients with two nodules or more were 95%, 82% e 82% at 1, 2 and 3 years respectively (p = n.s.). Survival rates in patients with nodules less than 5 cm were 88%, 73%, 73% while in patients with nodules greater than 5 cm were 89%, 77% e 77% at 1, 2 and 3 years respectively (p = n.s.). During the follow-up (5-46 months) 48 (45%)

patients showed intrahepatic recurrences; 41 out of them were retreated with new sessions of PEI-u.g.a. or conventional PEI. PEI-u.g.a. is an effective, fast and inexpensive therapy in patients with large and/or multiple HCC on cirrhosis.
Author (EI)
Ethyl Alcohol; Chemotherapy; Medical Science; Anesthetics; Patients

19980006043

Percutaneous ethanol injection (PEI) of large autonomous hyperfunctioning thyroid adenoma

Tarantino, L., D.Cotugno Hospital, Italy; Giorgio, A.; Aloisio, V.; Perrotta, A.; Forestieri, M. C.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1401; In English; Copyright; Avail: Issuing Activity

Patients with hyperfunctioning thyroid adenoma underwent percutaneous ethanol injection (PEI) treatment and were evaluated to verify the effectiveness of the treatment. Scintigraphy, ultrasonography and TSH assay were conducted 3 months after the end of the treatment. PEI of hyperfunctioning thyroid nodules of greater than 30 ml may be a safe, well-tolerated, effective and inexpensive therapy.
EI
Ethyl Alcohol; Thyroid Gland; Medical Science; Drugs; Imaging Techniques; Ultrasonics; Bioassay

19980006044

Ultrasound-guided liver biopsy could replace blind biopsy in diffuse liver diseases. A retrospective study of 1550 patients

Corsetti, M., U.O. Gastroenterologia, Italy; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1402; In English; Copyright; Avail: Issuing Activity

The aim of this retrospective study was to compare the efficiency and complications of percutaneous hepatic biopsy either guided by ultrasonography in the left lobe, or blindly by the intercostal route in the right lobe, in the diagnosis of diffuse liver diseases. Liver biopsy was performed in 1.550 patients for 8 years. In group 1 (485 patients, including 120 out-patients), liver biopsy was guided by ultrasound/In group 2, blind intercostal liver biopsy was performed in 1065 patients. Patients were observed for 6 hours after biopsy in both groups. The failure rate of liver biopsy was significantly lower in group 1 (0,1%) than in group 2 (10,42%, P less than 0.01). The prevalence of the histological lesions was similar in both groups. No related-biopsy death occurred. Complication were more serious after blind biopsy (2 large intrahepatic hematoma, 1 large extrahepatic hematoma, 1 bile leakage around the gallbladder, 1 hemoperitonitis) than after guided biopsy (none major complications). Hepatic biopsy guided by ultrasonography could replace blind biopsy in the diagnosis of diffuse liver diseases.
Author (EI)
Medical Science; Imaging Techniques; Ultrasonics; Patients; Medical Equipment; Diseases

19980006046

Prognostic factors for survival in cirrhotic patients with hepatocellular carcinoma (HCC) treated with percutaneous ethanol injection (PEI)

Trombino, Concetta, Universita Cattolica Sacro Cuore, Italy; Pompili, Maurizio; Caturelli, Eugenio; Villani, Maria R.; Lorenzelli, Gian P.; Rapaccini, Gian L.; Gasbarrini, Giovanni; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1404; In English; Copyright; Avail: Issuing Activity

Our group has recently shown that alphafetoprotein (AFP) before PEI (AFP1) greater than 25 ng/mL, and AFP one month after PEI (AFP2) greater than 13 ng/mL were factors independently associated to intrahepatic tumor recurrence in patients with single HCC tated by PEI. The aim of this study was to evaluate factors affecting long term survival in cirrhotic patients with single HCC treated by PEI. Forty Child-Pugh class A cirrhotic patients with a single HCC smaller than 5 cm treated by PEI were enrolled; the average follow-up was 33 +/- 16 months. The following parameters were evaluated as prognostic indicators of survival: age, sex, HBsAg, HCVAb, ALT, AST, AFP1, HCC size, HCC ultrasound pattern, HCC histological grading, HCC capsule, time from cirrhosis diagnosis, AFP2, HCC recurrence in the same or different liver segment, portal vein increased diameter, spleen enlargement, presence of oesophageal or gastric varices. Cumulative survival curves were made by Kaplan-Meier method. All variables significant at the log rank test were analyzed by multivariate Cox's proportional hazards model. Our results demonstrated that cumulative 3-year survival rate was 50%. AFP1 greater than 25.0 ng/mL, AFP2 greater than 13.5 nmL, and spleen enlargement were independent factors significantly linked to survival. These results suggest that increased AFP1 and AFP2 serum levels are significantly related to survival independently from diagnosis of intrahepatic HCC recurrence. Furthermore, in patients with HCC complicating well compensated cirrhosis, survival might be also related to the presence of portal hypertension. In conclusion, it

appears from our results that, in well compensated cirrhotics with a single HCC treated by PEI, AFP1 greater than 25.0 ng/mL, AFP2 greater than 13.5 ng/mL, and spleen enlargement are indicators of a poor prognosis.
Author (EI)
Ethyl Alcohol; Medical Science; Drugs; Imaging Techniques; Ultrasonics; Patients

19980006052
Cirrhotic patients with and without ascites: Echo-Doppler study of renal blood flow
Sperandeo, M., IRCCS-'CSS Hospital', Italy; Caturelli, E.; Sperandeo, G.; Villani, M. R.; Carughi, S.; Varriale, A.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1203; In English; Copyright; Avail: Issuing Activity

In liver cirrhosis there is a progressive sodium retention by kidney, depending on a decreased renal perfusion by arteriolar vasoconscriction. Purpose of this study was to evaluate the usefulness of echo-color-Doppler, a non invasive procedure, in detecting haemodinamic impairment in cirrhotic patients. We studied 58 cirrhotic patients (28 females and 30 males), age ranged between 50 and 75 years; of these, 19 presented ascites, no patients had epato-renal syndrome, parenchymal of vascular renal disease, serum creatinine level was within normal value, no patients was treated by diuretics; 18 healthy subjects, not affected by liver and renal diseases, were studied as control group (11 males and 7 females), age ranged 47 and 74 years We measured Pulsatility Index (P.I.) and Resistivity Index (R.I.) by echo-Doppler at interlobular arterioles, visualized by color Doppler. Both parameters resulted to he higher in cirrhotics (P.I. = 1.46 +/$MIN 0.25, R.I. = 0.76 +/ - 0.08) that in control subjects (P.I. = 1.07 +/ - 0.09, R.I. = 0.60 +/ - 0.03). The difference was statistically significant, moreover both indexes resulted to be higher in cirrhotic patients with ascites than in those without. In conclusion our study confirmed other preliminary reports revealing that in liver cirrhosis there is an intrarenal vasoconscriction, already before ascites formation, this vasoconscriction can be well detected by echo color Doppler, a non invasive procedure, even in non advanced stages, viding informations for prognosis and therapy.
Author (EI)
Blood Flow; Electrical Resistivity; Hemodynamics; Imaging Techniques; Medical Equipment; Medical Services

19980006055
Local therapy with octreotide (sandostatin) in acute necrotizing pancreatitis, pancreatic pseudocysts and fistulas
Grigorov, N., Univ. Hospital 'Queen Joanna', Bulgaria; Mendisova, A.; Nikolova, St.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1906; In English; Copyright; Avail: Issuing Activity

15 patients with acute and subacute necrotizing pancreatitis, 29 patients with formed pancreatic pseudocysts and 12 pancreatic fistulas have been treated locally with Sandostatin applied 0.2 mg once or several times. This treatment has been performed on a background of the perceived by us as a routine percutaneous drainage and lavage under US-control and Sandostatin (0.1-0.3 mg daily s.c.). The combined parenteral and local treatment coupled with percutaneous drainage reduces the healing period significantly with 10 out of 15 patients in the I group (66.7%) and 23 out of 29 patients in the II group (79.3%). This effect is also confirmed by the fact, that in 11 patients, who did not have a significant improvement (US and CT control) from the perceived until now basic therapy, the additional local application (via the catheter) of Sandostatin sharply improved the clinical state and shortened the healing period. The pathogenic mechanism is probably connected with a direct influence on difficulty closing fistulas, which complicate this mechanism and make ineffective the basic procedures. A confirmation about that are the cured 8 out of 12 patients (66.7%) with pancreatic fistulas proved by x-ray. With the exception of one patient (transitory flush and slight dyspepsia), the other did not show side effects. The local application of Sandostatin can be added to the therapeutic approach in acute necrotic pancreatitis and pancreatic pseudocysts, especially in protracted cases.
Author (EI)
Chemotherapy; Diseases

19980006058
Accuracy of US and MR in the detection of hepatocellular carcinoma in end-stage cirrhotic livers
Sureda, D., Hospital General del Valle Hebron, Spain; Perez, M.; Allende, H.; Andreu, J.; Gonzalez, C.; Sanchez, C.; Lopez, M.; Dominguez, R.; Margarit, C.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1003; In English; Copyright; Avail: Issuing Activity

To assess the accuracy of sonography (US) and magnetic resonance (MR) in detecting small hepatocellular carcinomas (HCC) in end-stage cirrhotic livers. 215 resected livers from patients who had undergone liver transplantation. 68 HCC were found in 49 patients; 47 patients had preoperative US and 18 had MR. Preoperative and histological studies were compared. The interval between examination and transplantation was under one month. Pathological examination showed 67 HCC in 47 patients. Preoperative US detected HCC in 38 of 47 patients (80,8%). Sonography showed 43 neoplastic nodules in a total of 68 HCC (63,2%).

Of the 25 undetected HCC, 10 were less than 15 mm, 12 were 15-30 mm and 3 were greater than 30 mm in diameter. MR detected HCC in 16 of 18 patients (88%) and showed 19 of 25 neoplastic nodules (76%). MR is more sensitive than US in detecting small HCC in end-stage cirrhotic livers and should be performed before transplantation.
Author (EI)
Imaging Techniques; Medical Equipment; Magnetic Resonance; Ultrasonics; Patients; Surgery; Transplantation

19980006059

Study on qualitative diagnosis of asymptomatic cholelithiasis with echopatterns

Ono, Yoshiki, Nihon Univ. Sch. of Medicine, Japan; Abe, Mayumi; Ogawa, Masahiro; Arakawa, Yasuyuki; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1004; In English; Copyright; Avail: Issuing Activity

To make correct qualitative diagnosis of asymptomatic gallstone on the basis of the echopatterns the exhibited. Fifty-one (51) of our patients who were diagnosed with gallstones underwent cholecystectomy and the stones were then subjected to chemical analysis. The results were then compared with the pre-operative echopatterns for each patients. Two hundred forty-seven (247) patients with asymptomatic cholelithiasis (179 male, 68 female) were classified by echopatterns. Cholesterol stones produced these different echopatterns, comet tail, sonolucent, halfsonolucent and shell stone. Pigmental stone was considered as an irregular echotopattern. Seventy seven point four percent (77.4%) of asymptomatic cholelithiasis were represented as cholesterol stone on the basis of the echopatterns. It is useful to use echopatterns to make a qualitative diagnosis on asymptomatic cholelithiasis.
Author (EI)
Imaging Techniques; Medical Equipment; Patients; Chemical Analysis; Diagnosis

19980006062

Value of ultrasonically guide fine-needle aspiration cytology in the renal transplant failure dysfunction

Cuvertino, Eduardo Rafael, Natl. Hospital of Clinicas, Argentina; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUO 2002; In English; Copyright; Avail: Issuing Activity

We show a series of 78 patients with post-transplant renal failure in whom were effected ultrasonically guide needle biopsy, including fine needle aspiration (for cytology and culture cellular with inmuno- marker) and guided cutting biopsy (for conventional anatomopathologic and inmunofluorescency studies). The comparison shows signs in which the diagnosis of rejection (acute or chromic); acute tubular necrosis, ischemia and infarction; was rapidly confirmed by fine needle aspiration (3 to 6 hrs), letting the rapid rescue of the implants, reaching a diagnostic accuracy between the 80 and 93% of the cases. We point out the objective and technical principles, remarking that guide fine needle aspiration biopsy can provide high specificity and sensitivity in differentiating the allograft dysfunction, reducing the risks of core biopsy (intrarenal arteriovenous fistula's; pseudoaneurysm; rupture; urinoma and fistula, hematoma, etc.).
Author (EI)
Cytology; Transplantation; Implantation; Surgery; Diagnosis

19980006066

Transrectal ultrasound and endorectal coil MRI in staging of rectal cancer

Iannicelli, Elsa, 'La Sapienza' Univ., Italy; Grasso, Francesco Rosario; Chianta, Giuliana L. A.; Salvini, Vittorio; Poggi, Raffaela; Passariello, Roberto; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1902; In English; Copyright; Avail: Issuing Activity

We evaluated the accuracy of Transrectal Ultrasound in staging of rectal cancer comparing to endorectal MRI. 22 patients were examined with both techniques using transrectal 7,5 MHz linear and biplanar probes and with MR 0,5 T unit by means an endorectal coil. Two radiologist evaluated US and MR findings independently. All patients underwent surgery. Transrectal Ultrasound showed high accuracy in staging intraparietal rectal cancer (T1-T2 stage) similar to endorectal MR coil. In extraparietal tumors and in the detection of perirectal limphadenopathy US showed lower accuracy rate than MR. Considering these results and in reason of its low cost-effectiveness. Transrectal Ultrasonography can be proposed as first diagnostic modality in the evaluation and staging of rectal cancer.
Author (EI)
Imaging Techniques; Medical Equipment; Magnetic Resonance; Ultrasonics; Diagnosis; Surgery

19980006077

Portal vein trombosis - case report

Kanegusuku, Marilu S., Universidade Federal do Parana, Brazil; Amaral, Joao G. P. V.; Bertoldi, Angela; Braga, Larissa; Narciso, Hugo R.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1019; In English; Copyright; Avail: Issuing Activity

Portal vein trombosis (P.V.T.) is a rare disease that affects children and adults. It produces several clinical manifestations, and many factors play a role on its genesis. This report describes a five years old patient presenting fever, abdominal pain and distension for fifteen days. During the investigation the child developed jaundice, hepatosplenomegaly and excretion of 'bile pigments' in urine. Laboratory exams showed an infestation by Ascaris Lumbricoides. The study was completed with x-ray examinations, Ultrasonography, Computed Tomography and Arteriography.

Author (EI)

Patients; Imaging Techniques; Medical Equipment; Ultrasonics; X Ray Analysis; Computer Aided Tomography

19980006079

Colon lipoma associated with intussusception

dos Santos, Marcos Vinicius Miranda, Complexo Hospitalar Heliopolis-HOSPHEL, Brazil; de Andrade Vieira, Vilma Lucia; de Souza, Ricardo Pires; Soares, Aldemir Huberto; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1017; In English; Copyright; Avail: Issuing Activity

The authors report a case of a 53-years-old woman, with history of abdominal pain and rectal bleeding. She presented a pedunculated colon lipoma representing the nidus of one intussusception. Lipomas are uncommon colon neoplasms, which is the second cause of benign tumors, apart adenomas. These lipomas prodominate in women and in the later years of life. Pre-operative ultrasonography exam shows tubulate formation with concentric layers associated to a round, smooth, sharply outlined isoecogenic mass. Our aim is to do a review on the literature about colon lipoma and compare the results obtained both through ultrasound examination and computer tomography, barium enema and surgical procedures.

Author (EI)

Medical Science; Imaging Techniques; Ultrasonics; Computer Aided Tomography; Medical Equipment

19980006082

Endoscopic ultrasound (EUS) and histology correlation in gastrointestinal tumors

Montorfano, Miguel, Centro de Gastroenterologia, Argentina; Necchi, Fabiana; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1605; In English; Copyright; Avail: Issuing Activity

EUS and histologic correlation in patients with upper and lower gastrointestinal tumors, according to TNM staging system. From August 1993 and November 1996 we performed 330 EUS; 160 in order to stage gastrointestinal malignant tumors: 78 corresponding to the upper gastrointestinal tract (31 esophageal epidermoid carcinoma and 13 adenocarcinoma, 34 gastric carcinoma) and 82 to rectum. Average age was 63,37 years (30:89) Males, 63; females, 97. 90 patients were excluded: 36 because according to EUS results were included in non-surgical protocols (radio or chemotherapy); 57 because we had no adequate follow up. 67 patients had hystologic correlation. We used an echoendoscope Olympus EU-M20 with a radial 360$DGR sector scanner. Patients lied in the left lateral position, with midazolam premedication. The EUS overall accuracy in T staging was 83%, and in N staging 74%, with 89% of sensitivity and 51% of specificity. 10% were non-traversable tumors. We had overstaging cases due to peritumorous inflamatory changes. Misstaging were attributed to the presence of lymph nodes seen by EUS, not infiltrated in the hystologic evaluation. Understating were due to peritoneal carcinomathosis. We believe EUS is essential in the diagnosis of gastrointestinal tract cancer. The close correlation between EUS and pathologic staging allows clinicians to define the strategy for treatment: surgery vs palliation in advanced cancer, endoscopic or minimal surgical resection in early stage tumors.

Author (EI)

Gastrointestinal System; Medical Science; Imaging Techniques; Ultrasonics; Endoscopes; Medical Equipment

19980006087

Granulomatous prostatitis. Color Doppler imaging and transrectal ultrasound

Andreu, J., Hospital General del Valle Hebron, Spain; Mac-Kines, J.; Rodriguez, M.; Lopez, M.; Sureda, D.; de Torres, I.; Morote, J.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUO 2904; In English; Copyright; Avail: Issuing Activity

To present the transrectal ultrasound and color Doppler findings in granulomatous prostatitis. We reviewed a total of 200 transrectal prostate biopsies; 12 corresponded to cases of granulomatous prostatitis. The ultrasound and color Doppler findings in this entity are presented. The most frequent ultrasound finding was hypoechoic nodules (single or multiple) in the peripheral

prostate. In 33% there was capsular invasion and only 1 case showed seminal gland involvement. The Doppler signal was increased in 66% of cases; in the majority, the increase was marked. Granulomatous prostatitis coexisted with neoplasia in 33% of cases. Granulomatous prostatitis forms a part of the differential diagnosis of hypoechoic lesions of the peripheral prostate. Author (EI)

Imaging Techniques; Medical Equipment; Ultrasonics; Diagnosis; Doppler Effect

19980006088

Spectrum analysis for classifying and evaluating prostate tissue

Feleppa, Ernest J., Riverside Research Inst., USA; Lizzi, Frederic L.; Fair, William R.; Liu, Tian; Larchian, William; Reuter, Victor; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUO 2902; In English; Copyright; Avail: Issuing Activity

In 1996, approximately 1,000,000 biopsies are performed for prostate cancer, over 300,000 new cases are detected, and over 40,000 men die from this disease in the USA. Most biopsies prove to be negative, and about 1/3 of those are false; i.e., many biopsies prove to be unnecessary or miss cancer that is present. Spectrum analysis of radio-frequency ultrasonic echo signals shows useful differences between spectral parameters of cancerous and non-cancerous prostate tissue. Our results are based on over 100 histologically classified patients, and give an ROC-curve area of 79% for cancer detection using spectrum analysis vs. 60% for conventional imaging. We can depict spectral-parameter values in 2- or 3-D images. Real-time 2-D parameter images promise to reduce false-negative biopsies by allowing better biopsy guidance and can reduce costs and risk of true-negative biopsies though improved imaging specificity. 3-D parameter images may improve volumetric disease evaluation, and thereby, treatment planning and therapy monitoring. These methods are based on an empirically validated theoretical framework that relates microscopic scatterer properties to spectral-parameter values. This research is supported in part by US DHHS NIH/NCI Grant CA53561. Author (EI)

Prostate Gland; Spectrum Analysis; Tissues (Biology); Medical Science; Imaging Techniques; Ultrasonics; Medical Equipment

19980006089

Diagnosis of acute appendicitis in adults US and CT with surgery correlation

Kugler, C., Clinica Pasteur, Argentina; Pelaez, V.; Zabert, G.; Urrere, C.; Guangiroli, M.; Acuna, J.; Molina, J.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1015; In English; Copyright; Avail: Issuing Activity

We assessed the efficacy in terms of sensitivity and specificity in the use of the US and CT in identifying patients adults with clinical findings suspected of appendicitis, who required emergency laparotomy. US and CT of the lower abdomen was performed in 50 patients with clinical findings of appendicitis (22 women and 28 men, 17-67 years old). All ultrasonography studies were performed with a 5-10 Mhz linear and 2-4 Mhz convex transducer (ATL U9 HDI). The CT examination (GE Sytec 2000i) were obtained by using 10 mm collimation at 10 mm intervals from the L3 level to the symphysis pubis without IV or oral contrast material. Prospective diagnoses based on US and CT findings were compared with surgical results (45 patients) and clinical follow-up (5 patients without laparotomy). US and unenhanced CT was an accurate imaging technique for the initial examination of patients with suspected acute appendicitis. The US sensitivity was 88%, the specificity was 62%, the positive predictive value was 92%, and the negative predictive value was 50%. The CT sensitivity was 89%, the specificity was 71%, the positive predictive value was 95% and the negative predictive value was 83%. This study shows that US and unenhanced CT was a useful test to diagnose appendicitis in patients with clinical findings suspected, in correlation with reports of the world literature. Author (EI)

Human Beings; Imaging Techniques; Medical Equipment; Ultrasonics; Computer Aided Tomography; Collimators; Diagnosis

19980006090

Gallstones morphological characteristics. Randomized echographic study in Rosario, Argentina

Brasca, Alfredo, Univ. Nacional Rosario, Argentina; Pezzotto, Stella; Berli, Daniel; Villavicencio, Roberto; Gianguzzo, Maria; Fay, Oscar; Poletto, Leonor; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1014; In English; Copyright; Avail: Issuing Activity

There were no randomized studies about cholelithiasis in our country. As echography is the most suitable diagnostic method for gallstones' detection, it was applied in this population randomized study. The objective was to determine gallbladder and gallstones morphological characteristics. A total of 1166 subjects 20 years and older were studied in this sample with high resolution echography, and 149 persons with gallstones were diagnosed. The number of gallstones found was: 1, 42%; 2, 11%; 3, 2%; 4, 45%. The mean size was 14.4 mm, 14% were less than 5 mm, and only 1% greater than 30 mm. The 91% of gallstones were movable, and only 5% were enclaved. Gallbladder size was normal (15-40 mm) in 96%, with normal wall in 95%, and biliary sludge was

found in 6% of the subjects with gallstones. Multiple stones were more frequent than single stones, there mean size was 14.4 mm, and almost all of them had morphologically normal gallbladder.
Author (EI)
Imaging Techniques; Medical Equipment; Morphology; Random Processes; Diagnosis

19980006094
Effect of He-Ne laser on lymph nodes of rabbits
Li, Hongye, Binzhou Medical Coll., China; Liu, Guixiang; Wu, Lijun; Liu, Wenbo; Yan, Zhiwei; Zhongguo Jiguang/Chinese Journal of Lasers; May, 1997; ISSN 0258-7025; Volume 24, no. 5, pp. 477-480; In Chinese; Copyright; Avail: Issuing Activity

Effect of He-Ne laser-irradiation of the cervicales anteriores region and of acupoint irradiation on rabbits was studied. The nodi lymphatic cervicales anteriores were observed by optical microscopy and transmission electron microscopy. The serum-IgG was measured with a simple immunodiffusion method. The results show that the ultrastructures of many kinds of cells in the lymph-nodes both region-irradiated and acupoint-irradiated were changed. The function of the cells appeared activized. The serum-IgG of the acupoint irradiation groups was much more than the control group. It was suggested that He-Ne laser enhancing of cellular and humoral immunities of the organism was on the basis of changes the cell ultrastructures. In conclusion, the immunity of the entire organism was enhanced by the laser acupoint-irradiation, but the region-irradiation only improved the immunity of the irradiated region.
Author (revised by EI)
Helium-Neon Lasers; Laser Outputs; Electromagnetic Interactions; Lasers; Immunology

19980006108
Duplex Doppler assessment of hepatic venous flow in liver disease
Teichgraeber, U. K. M., Medical Sch. Hannover, Germany; Gebel, M.; Manns, M. P.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1209; In English; Copyright; Avail: Issuing Activity

Determine the differences in flow velocities and pattern of hepatic venous flow in health and liver disease. Duplex Doppler measurements of the middle hepatic vein (MHV) in sustained mid-inspiration were performed in 25 health subjects, 5 patients with acute hepatitis, 12 patients with chronic hepatitis without cirrhosis and 19 patients with cirrhosis. Maximum flow velocities and flow pattern of the MHV were determined. Three hepatic venous flow components were defined: phase 1 systolic and phase 2 diastolic amplitude, phase 3 regurgitant flow from atrial contraction. Patients with hepatic diseases showed three patterns: triphasic, biphasic and monophasic waveforms. Patients with liver cirrhosis displayed a flattening of the waveform and a decrease in maximum flow velocities ($p = 0.03$). Maximum flow velocities in the MHV in patients with cirrhosis were - 0,17 +/ - 0.08 m/s (phase 1), - 0.14 +/ - 0.025 m/s (phase 2) and 0.08 +/ - 0.01 m/s (phase 3). Patients with acute hepatitis showed an increase of the maximum flow velocities compared to the healthy subjects and patients with chronic hepatitis without cirrhosis were comparable. Diminished flow velocities in cirrhosis can not be explained by vessel compression alone. Cirrhotic changes seem to be responsible for these changes, allowing less pulsation of the liver. In contrast, acute hepatic causes an increase in flow velocities and pulsation, due to compression of the hepatic vein. Duplex Doppler examination is helpful in the assessment of sever pathophysiological changes of the liver.
Author (EI)
Hemodynamics; Blood Vessels; Flow Distribution; Diseases; Imaging Techniques; Medical Equipment

19980006109
Diagnostic significance of severe portal vein pulsatility in patients with cardiac disease
Gorka, Tanja S., King Fahad Natl. Guard Hospital, Saudi Arabia; Gorka, Waldemar A.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1208; In English; Copyright; Avail: Issuing Activity

Pulsatile portal venous flow in patients with cardiac disease has been associated with severe tricuspid regurgitation (TR), suggesting direct transmission of the fluid wave from the right heart through the hepatic sinusoids towards the splanchnic circulation. The aim of our study was to find new explanations for the phenomenon of severe portal vein pulsatility (SPP), defined as systolic flow interruption or reversal. We examined 35 cardiac patients (mean age 58 +/- 19 years) with SPP by echocardiography, including Doppler interrogation of hepatic and portal veins. Cases of liver disease were excluded. The underlying diagnosis was left ventricular dysfunction due to ischemic or myopathic heart disease in 19, rheumatic heart disease in 10 and chronic lung disease in 6 cases. The severity of TR was judged by the size of the regurgitant jet on the color flow image. Peak pulmonary artery pressure (PAP) was calculated by measuring the right ventricular-right gradient by Doppler, adding the right atrial pressure derived from the IVC collapsibility index. 17 patients demonstrated severe TR with systolic reverse flow in the hepatic vein (HV) and PAP of 57 +/- 15 mmHg. The remaining 18 patients with mild to moderate TR and no systolic flow reversal in the HV revealed

PAP of 63 +/- 17 mmHg. Thus only half of the patients in our study group demonstrated a grade of TR severe enough to induce systolic flow reversal in the HV and possible direct transmission to the portal vein. However, all patients were shown to have severe pulmonary hypertension (PAP 61 +/- 16 mmHg). 1. Our data suggest that severe pulmonary hypertension induces SPP irrespectively of the degree of TR, presumably by increasing hepatic venous outflow resistance with consecutive transsinusoidal shunting between the hepatic artery and portal vein. 2. Severe portal vein pulsatility could thus be used as an additional indicator of severe pulmonary hypertension.
Author (EI)
Heart Diseases; Hemodynamics; Pulses; Unsteady Flow; Blood Vessels; Echocardiography; Diseases

19980006120
Vascular patterns of benign hepatic lesions with Levovits-enhanced Doppler ultrasonography
Sciarrino, Elio, Ospedale 'V. Cervello', Italy; D'Antoni, Adele; Orlando, Ambrogio; Virdone, Roberto; Pagliaro, Luigi; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1609; In English; Copyright; Avail: Issuing Activity

Doppler signal pattern can be useful in discriminating hepatic lesions. Study's aim is to describe vascular pattern of benign hepatic lesions after infusion of Levovist (Schering), a galactose-based i.v. sonographic contrast agent. We performed Doppler sonography with an equipment ESAote AU4 Idea, before and after Levovist in 8 patients referred for the evaluation of hepatic lesions: 3 angioma, 3 adenoma, 1 focal steatosis, 1 focal nodular hyperplasia (FNH). Angioma, adenoma and FNH showed not signal at Doppler. After Levovist signal was detected in 2 angioma (single arterial spot), in 3 adenoma (venous periferal signal in 1 and venous scanty spots in 2); in FNH arterial strong signals inside and around the lesion were evident. In focal steatosis weak arterial and venous signals were present at Doppler, after Levovist a normal vascular pattern appeared. Doppler signals after Levovist are frequent in benign lesions even in absence of signal before infusion. Vascular patterns can be characteristic.
Author (EI)
Cardiovascular System; Imaging Techniques; Ultrasonics; Medical Equipment; Drugs; Blood Vessels

19980006125
Treatment of hepatocellular carcinoma with percutaneous ethanol injection. A multicentric study
Garre, M. C., Hospital 'Virgen de la Arrixaca', Spain; Lopez Cano, A.; Munoz, A.; Benitez, E.; Bas, A.; Sola, J.; Blanco, J. M.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1418; In English; Copyright; Avail: Issuing Activity

We present a prospective multicenter study to evaluate the treatment of the hepatocellular carcinoma (CHC) with percutaneous ethanol injection (PEI), analyzing the survival and histologic findings in patients with orthotopic liver transplantation (TOH). We have treated a total of 46 CHC in 34 patients, all with equal size 5 cm or less in diameter. The technique was carried out with fine needles of 22 G and ultrasound control, injecting a variable volume of ethanol in accordance with the size of injury. The survival rate was analyzed by the Kaplan test and the differences with the Chi-squared test and the correction of Pearson. We have observed a global survival rate at 12 months of 87% at 24 months of 74% and at 31 months of 34%. We have found a relation of the survival rate with the Child's grade, the presence the halo and the sex. The post-transplant pathologic study of 7 CHC, showed necrosis of 100% in 5(71.5%), satellite nodules in 1 (14%), vascular thrombosis in 4 (57%) and extracapsular necrosis in 4(57%). The PEI is an effective treatment of small size CHC. Survival is related with the Child's grade, the presence of halo and sex.
Author (EI)
Ethyl Alcohol; Medical Science; Chemotherapy; Surgery; Transplantation; Needles

19980006143 Wisconsin Univ., Dept. of Horticulture, Madison, WI USA
Space Experiment on Tuber Development and Starch Accumulation for CELSS ***Final Report***
Tibbitts,Theodore W., Wisconsin Univ., USA; Croxdale, Judith C., Wisconsin Univ., USA; Brown, Christopher S., Wisconsin Univ., USA; 1997; 8p; In English
Contract(s)/Grant(s): NAS10-12180; NAGw-4022
Report No.(s): NASA/CR-97-206666; NAS 1.26:206666; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Potato explants (leaf, small stem section, and axillary bud), flown on STS-73, developed tubers of 1.5 cm diameter and 1.7 g mass during the 16 day period of spaceflight. The experiment was undertaken in the ASTROCULTURE(Trademark) experiment package under controlled temperature, humidity, lighting, and carbon dioxide concentrations. The tubers formed in the explant system under microgravity had the same gross morphology, the same anatomical configuration of cells and tissues, and the same sizes, shapes, and surface character of starch granules as tubers formed in a 1 g environment. The total accumulation of starch

and other energy containing compounds was singular in space flight and ground control tubers. Enzyme activity of starch synthase, starch phosphorylase, and total hydrolase was similar in spaceflight and ground controls but activity of ADP-glucose pyrophosphorylase was reduced in the spaceflight tuber tissue. This experiment documented that potatoes will metabolize and accumulate starch as effectively in spaceflight as on the ground and thus this data provides the potential for effective utilization of potatoes in life support systems of space bases.
Derived from text
Potatoes; Spaceborne Experiments; Space Transportation System; Life Support Systems; Closed Ecological Systems; Microgravity; Enzyme Activity; Carbon Dioxide; Starches

19980006151
Penile ecodoppler
Mekhitarian, Armenio, Sao Paulo Univ., Brazil; Cerri, Giovanni Guido; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUO 2454; In English; Copyright; Avail: Issuing Activity

To establish cavernosal artery velocity under of that we could say the patient should have arteriogenic erectile dysfunction. We perform the cavernosal arteries ecodoppler, measuring the basal peak systolic velocity in penile relaxed state and the arteries diameters. An intracavernosal injection of 70 mg from papaverine is made and again the diameters are measured, the peak systolic, end diastolic velocities, systolic acceleration, resistance and penile blood flow index. On those patients with arteriogenic erectile dysfunction, we found basal cavernosal velocities (BCV) under 15 cms. Arteriogenic erectile dysfunction has BCV under 15 cm/s.
Author (EI)
Blood Vessels; Drugs; Hemodynamics

19980006153
Utility of central prostate biopsy in detecting prostate carcinoma
Lopez, M., Hospital General del Valle Hebron, Spain; Jose Martinez, M.; Andreu, J.; Hernandez, D.; Sureda, D.; Mac-kines, J.; De Torres, I.; Morote, J.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUO 2903; In English; Copyright; Avail: Issuing Activity

Prostate carcinoma is most frequently located in the peripheral zone (PZ). One third (30%) of all prostate carcinomas originate in the central zone (CZ). Our aim was to determine the effectiveness of central zone biopsy in the diagnosis of prostate carcinoma. Over a 1-year period, 110 sonographically-guided transrectal biopsies were carried out. Randomized sextant biopsies of PZ and 2 cores from CZ were obtained with an automatic biopsy gun using a Monopty-Band needle (18 G). The histological results showed 62 carcinomas. 38 (61.3%) were detected in cores from both PZ and CZ. 23 (37.1%) only in PZ and just one in CZ. In the detection of prostate carcinoma by transrectal biopsy, the addition of central prostate cores to randomized sextant biopsies did not produce a statistically significant increase in the diagnostic efficacy of the procedure.
Author (EI)
Prostate Gland; Medical Science; Diagnosis; Imaging Techniques; Ultrasonics; Medical Equipment

19980006165
Primary epiploic appendagitis (P.A.E.) diagnosis by US and CT
Horvarth, Eleonora, Clinica Alemana, Chile; Majlis, Sergio; Seguel, Solange; Whittle, Carolina; Niedmann, Juan Pablo; Soffia, Pablo; Kinnon, John Mac; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1008; In English; Copyright; Avail: Issuing Activity

This report describes the ultrasonographic (US) signs of primary epiploic appendagitis (PEA), correlated with computed tomography (CT) findings. PAE was diagnosed in 23 patients (6 women and 17 men), aged 23 to 65 years old, complaining of localized abdominal pain in the left iliac fosae (19 cases) or right iliac fosae (4 cases). None of them had fever, alteration of the intestinal transit or vomiting. Their laboratory test were also normal. The diagnostic of PEA was done with US and confirmed with CT, in all cases. Patients received only symptomatic treatment and the abdominal pain disappeared in 2 to 60 days. The typical ultrasonographic image, was an oval non-compressible hiperechogenic mass, related to the colonic and abdominal wall, ranging 2 to 4 cm. in diameter. The mass was surrounded by a thin hypoechoegnic halo, in 17 cases. C.T. confirmed a fatty mass connected to the surface of the colon, with a hyperattenuating ring 0.2-0.3 cm. thick, without abdominal or pelvic inflamatory signs. PEA is a pathology of spontaneous resolution and probably sub-diagnosed, that must be included in the diagnostic work-up of adominal pain. Typical US images of PEA can avoid unnecessary treatments.
Author (EI)
Imaging Techniques; Medical Equipment; Ultrasonics; Computer Aided Tomography; Diagnosis; Image Analysis

19980006171

Superior mesenteric artery Doppler impedance indexes in chronic liver diseases

Piscaglia, F., Universita di Bologna, Italy; Gaiani, S.; Calderoni, D.; Valgimigli, M.; Donati, G.; Masi, L.; Bolondi, L.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1228; In English; Copyright; Avail: Issuing Activity

The hyperdynamic circulation in liver cirrhosis (LC) is believed to be triggered by a decrease of arterial splanchnic resistances. Aim of this study were: to evaluate SMA arterial impedance in different chronic liver diseases and to compare the use of two most commonly used Doppler US impedance indexes, the Pulsatility Index (PI) and the Resistance Index (RI). We evaluated 14 patients (mean age = 40.1 yrs) with chronic hepatitis (CH), 73 patients with LC not assuming vasoactive drugs: 37 without ascites and not under diuretics (group NA, mean age = 57.8 yrs) and 36 with ascites (group A, 57.9 yrs; 21 treated and 15 not treated with diuretics), 30 liver transplant (OLT) recipients for advanced liver cirrhosis (mean age = 47 yrs) in good stable conditions 4-24 months after surgery and 31 healthy controls (group C, 47.1 yrs). SMA Doppler: a) PI [(peak systolic velocity - minimum vel)/ mean vel)] and b) RI [(peak syst vel - end diast vel)/ peak syst vel] were measured. Student t-test was used to search the source of differences among the groups, if ANOVA p less than 0.05. SMA-PI differed (p less than 0.001) (mean +/- S.D. respectively 3.42 +/- 0.92, 3.28 +/- 0.57, 2.71 +/- 0.71, 2.40 +/- 0.70 and 2.77 +/- 0.69), being lower in both groups of cirrhotics and in OLT in comparison to controls (p less than 0.001) and to CH (p less than 0.05), not different to each other. SMA-RI tended to decrease in LC, but did not significantly differed among the five groups (C, CH, NA, A and OLT respectively 0.877 +/- 0.052, 0.073 +/- 0.033, 0.865 +/- 0.34 and 0.841 +/- 0.055, 0.849 +/- 0.046). No significant difference was found between ascitic pts treated or not with diuretics. A decrease of SMA impedance is already present in non ascitic cirrhotic patients, it worsens in those ascitic and persists after OLT, whereas it is still absent in CH. Reduced SMA impedance in OLT, may be explained by the persistance of porto-systemic collaterals, being liver function and portal pressure restored. Doppler PI proved to be more sensitive than RI in detecting the early hemodynamic changes.

Author (EI)

Hemodynamics; Doppler Effect; Acoustic Impedance; Statistical Tests; Blood Vessels

19980006177

Alterations of hepatic artery flow in postinflammatory liver cirrhosis

Elwertowski, M., Ultrasound Dep. Infectious Diseases Hospital, Poland; Leszczynski, S.; Sadownik, A.; Cianciara, J.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1219; In English; Copyright; Avail: Issuing Activity

Evaluation of liver morphological images is a suitable method revealing liver pathology, however it can not estimate degree of parenchymal damage. Portal flow alterations are one of late signs of advanced disease, venous flow measurements lack specificity for liver cirrhosis. The aim of our study was to evaluate mechanism of compensational increase of hepatic artery flow reported widely in pathophysiological literature. Presented material consists of 12 patients with confirmed postinflamatory liver cirrhosis (mean age 54), in whom complex US + Doppler study was performed with Toshiba 140a. Hepatic artery PI was further compared wit PI in renal artery (Hepatic Index-HI = PI hep.art./PI ren.art.). Measurements of PI in hepatic artery were normal (1,05 less than PI less than 1,50) in 64 patients, decreased in 35 and increased in 21 of them. When hepatic index was calculated it's decrease below 1,0 -confirming compensational increase of hepatic artery flow was observed in 58 patients, in 37 cases it's value was un changed (1,0 less than HI less than 1,40), while HI was significantly increased in 25 patients - suggesting decrease of the flow. Statistical analysis found no relation between alterations of arterial and venous live flow. to our surprise we found no statistical correlation between portal flow decrease and hepatic artery flow, while T-Student test presented significant statistical difference in HI values in patients with increased and decreased PI. Compensational increase of hepatic artery is present in 52% of patients with postinflamatory liver cirrhosis, 28% lacks any alterations of flow while in about 20% decrease of flow exist, contrary to common knowledge.

Author (EI)

Hemodynamics; Blood Vessels; Imaging Techniques; Ultrasonics; Medical Equipment; Computation

19980006178

Intrahepatic veno-venous anastomosis in patients with hepatic veins obstruction due to hydatid liver cyst

Tarantino, L., D.Cotugno Hospital, Italy; Giorgio, A.; de Stefano, G.; Perrotta, A.; Aloisio, V.; Forestieri, M. C.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1217; In English; Copyright; Avail: Issuing Activity

Compression of intrahepatic vessels or biliary ducts is a common complication of Hydatid Liver Cyst (HLC). Obstruction of hepatic veins (HV) due to HLC evolving in a fatal Budd-Chiari sindrome has been reported. We report 3 cases with HLC occlud-

ing only one or two HVs which drained with reversal of flow through veno-venous anastomosis in the patent adiacent HV. One case was asymptomatic and the diagnosis of a large HLC of the left lobe had incidentally been made at US. Another patient previously operated for hydatid liver cyst of the left lobe, referred pain and abdominal swelling for recurrence of 3 multilocular cysts of the left lobe. In both of them doppler-US showed reverse flow in the middle HV draining in the right HV. The left HV was undetectable. Both patients were successfully treated with percutaneous puncture-aspiration-injection (PAI) of ethanol, in double session in the first patient and in four sessions in the second patient. Another case came to our observation because of fever and abdominal pain radiating to the right flank. Abdominal US showed a large HLC of the VIII segment, ruptured in the right subfrenic space. Doppler US showed reversal of flow in the right HV draining through multiple shunts in the middle HV. This patient was successfully treated by percutaneous catheter (10 F) drainage lasting 20 days and orally administration of albendazole. At follow up (4-22 months) all the patients are alive and asymptomatic, the HLCs show a decreased size (40-50%) and 6 months after procedure, Doppler US showed normal direction of flow in the middle HV of the patient treated for post-surgical recurrences in the left lobe. In case of obstruction of one or more HV the patent HV can supply drainage toward inferior vena cava. Doppler US can show reversal of flow revealing obstruction of HV. PAI of HLC can prevent Budd-Chiari sindrome in patients with obstruction of one or two hepatic veins.
Author (EI)
Blood Vessels; Imaging Techniques; Ultrasonics; Medical Equipment; Diagnosis; Catheterization

19980006179

Effects of cerulein infusion on superior mesenteric artery blood flow (SMABF) in healthy subjects

Trombino, Concetta, Universita Cattolica Sacro Cuore, Italy; Pompili, Maurizio; Aliotta, Antonio; Luchetti, Roberto; Grattagliano, Anna; Rapaccini, Gian L.; Gasbarrini, Giovanni; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1216; In English; Copyright; Avail: Issuing Activity

After-meal cholecystokinin (CCK) serum level has been demonstrated to be increased in humans; therefore, this peptide has been supposed to take part in postprandial splanchnic hyperemia. Aim of this study was to study by Doppler ultrasound the effects of cerulein, a syntetic CCK analogous, on SMABF in healthy subjects. This double-blind study recruited ten healthy subjects who underwent, after an overnight fast, Doppler ultrasound examination of the SMABF under basal condition and after infusion of cerulein (4 ng/Kg/min during 5 min) or placebo, in two different days. Peak-systolic velocity (SV), end-diastolic velocity (DV), and resistivity index (RI) of superior mesenteric artery were evaluated at the following times: 10 min before (T-10), immediately before (T0), 5 min (T5), 8 min (T8), 10 min (T10), 15 min (T15), and 20 min (T20) after starting the infusion. For each patient, the ratio between the absolute value and the basal value was calculated at each time point. Statistical analysis was made by Student's t-test. Results showed that SV was significantly increased at T8 after cerulein ($p = 0.05$) but not after placebo. DV was significantly increased at T5 ($p = 0.04$), T8 ($p = 0.05$), and T10 ($p = 0.02$) after cerulein; on the contrary, DV was significantly decreased at T15, and T20 after placebo. RI was significantly decreased at T15 ($p = 0.03$) after cerulein; it did not significantly change after placebo throughout the study. These results show that cerulein infusion elicits a transient but significant decrease of the superior mesenteric artery resistance; this suggests that CCK is probably involved in the regulation of postprandial splanchnic hyperemia in humans.
Author (EI)
Blood Flow; Hemodynamics; Blood Vessels; Imaging Techniques; Ultrasonics; Medical Equipment; Drugs

19980006180

3-D image of tumor blood flows in HCC with power mode Doppler sonography

Tanaka, Sachiko, Osaka Medical Cent. for Cancer & Cardiovascular Diseases, Japan; Kitamra, Tsugio; Oshikawa, Osamu; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1215; In English; Copyright; Avail: Issuing Activity

As the characteristic color Doppler findings of HCC, we have reported a Basket pattern with tumor vessels; feeding artery and draining portal vein. However, visualizing the whole image of the blood flows of a tumor on a single tomogram is impossible. In this report, the advantage of 3-D (three dimensional) image of tumor blood flows in HCC with power mode Doppler sonography is presented. Equipment used is HDI-3000 (ATL, Botthel). It took about 10 sec. for recording and one min. for reconstruction of 3-D. 3-D image was effective for understanding total image of tumor blood flows, including basket pattern, feeders and drains. When we used 4-2 MHz convex probe, the findings could have been well compared with those of hepatic angiography. and the 3-D with 10-5 MHz linear probe could visualize more detailed tumor blood flows than by hepatic angiography.
Author (EI)
Blood Flow; Hemodynamics; Imaging Techniques; Ultrasonics; Medical Equipment; Flow Visualization; Cognition; Imagery

19980006184

U.S. of suprahepatic vessels blood flow

Cuvertino, Eduardo, Natl. Hospital of Clinicas, Argentina; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1210; In English; Copyright; Avail: Issuing Activity

The U.S. associated to the Color Doppler and Duplex is being used satisfatoryly to understand the hemodinamics changes of the liver. Normally the patterns of hepatic vein flow and the distribution, are directly relation with the atrial pressure of the right heart and the changes of the intrathoracic pressure, related with the respiratory activity. The alterations of the flow, may have an origin in associated pathologies to the cardiac cycle (cardiac insufficience; tricuspid regurgitation) or hepatic parenquimal affectation (cirrhosis; fatty infiltrate; sindrome Budd Chiari; veno-occlusive disease; intrahepatic transyugular portosystemic shunt dysfunction and others). Our purpose is to exhibit the patterns of normality and the changes in mentioned pathologies.

Author (EI)

Blood Flow; Hemodynamics; Imaging Techniques; Ultrasonics; Blood Vessels; Medical Equipment; Respirators

19980006185

Pure ethanol injection in the treatment of subcapsular hepatoma - is it safe?

Huang, Jee-Fu, Kaohsiung Medical Coll. Hospital, Taiwan, Province of China; Wang, Jing-Horng; Lin, Zu-Yau; Lu, Sheng-Nan; Wang, Liang-Yen; Chen, Shinn-Cherng; Chang, Wen-Yu; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1406; In English; Copyright; Avail: Issuing Activity

The purpose of the study was to evaluate the safety of pure ethanol injection (PEI) in subcapsular hepatoma. Nine patients with 12 nodular type hepatomas were studied. PEI was performed with Chiba needle (22 gauge, 15 cm long) using mixed ethanol solution (99.8% ethanol: 2% xylocaine = 5 or 10:1). Four nodule were treated using traditional method. Eight nodules were treated using intravascular injection through tumor supplying vessel. The puncture number was one to three per session according to tumor size and estimate effect. The dose of ethanol in each section ranged from 2 ml to 20 ml. Only mild pain and fever were observed during the treatment couses and following period Rupture of tumor was found in a 5.3 nodule which treated using traditional method without liver bed. In conclusion PEI in treatment of subcapsular hepatoma is safe and effective if lesion was injected through overlying nontumoral liver bed, once in one session of treatment, or intravascularly.

Author (EI)

Ethyl Alcohol; Drugs; Patients; Health; Risk; Medical Science

19980006186

Locating digestive endocrine tumors (DET) through endoscopic ultrasonography (EUS)

Varas, M. J., Universitat Autonoma of Barcelona, Spain; Maluenda, M. D.; Boix, J.; Armengol-Miro, J. R.; Teknon, C. M.; Quiron, C.; d'Hebron, H. Vall; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1606; In English; Copyright; Avail: Issuing Activity

18 patients who were presumed to have specific hormone syndromes were correlatively explored through US, TC, RM, Angiography, Octreoscan, and radial EUS. The group of 18 patients included 11 men (61%) and 7 women (39%), aged 60 on average. of these 18 patients, 13 had 16 ET in their pancreas, and 5 in their digestive tract. Five were shown not to have any tumors, so they were taken as the control group. The sensitivity and accuracy of the EUS was 75 and 78%, which is a higher percentage as compared with other image techniques. Specificity was 80%. Two pancreatic tumors were detected, which were either smaller of the size of one centimetre. On two occasions the exact location of a tumor was missed. The ecoendoscopic exploration of the pancreas could not be carried out completely in 11% of cases. EUS is a good preoperative technique for detecting DET, and its assessment of small size tumors is likely to be more accurate than that of other image techniques; EUS seems to be the main technique for the diagnosing, locating, and stage-monitoring of this rare sort of tumors (DET).

Author (EI)

Position (Location); Imaging Techniques; Medical Equipment; Ultrasonics; Endoscopes; Angiography; Medical Science

19980006187

DNA ploidy on biopsy for renal cell carcinoma

Hongo, Fumiya, Meiji Univ. of Oriental Medicine, Japan; Inoue, Wataru; Okihara, Koji; Saito, Toshihiko; Watanabe, Makoto; Saitoh, Masahito; Watanabe, Hiroki; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUO 2003; In English; Copyright; Avail: Issuing Activity

DNA content of renal cell carcinoma (RCC) in 39 patients on biopsy specimens and surgical specimens were examined in paraffin blocks with static cytofluorometry and flow cytometry. Findings of selective renal tumor biopsy guided by ultrasound for RCC coincided with those of surgical specimen in 27/39 (69%) in cell types, 29/39 (74%) in structural type, 26/39 (67%) in

gradings and 27/39 (69%) in ploidy patterns. It was anticipated that the grading of tumor might belong to G2 with a considerable probability, when the ploidy pattern of biopsy specimen indicated aneuploidy or polyploidy. It may be concerned that DNA histograms help the histological diagnosis by biopsy.
Author (EI)
Deoxyribonucleic Acid; Medical Science; Surgery; Cytology; Imaging Techniques; Ultrasonics

19980006190
Ultrasound-guided radiofrequency ablation of pancreatic adenocarcinoma
Patterson, Emma J., Univ. of British Columbia, Canada; Scudamore, Charles H.; Buczkowski, Andrzej K.; Owen, David A.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1905; In English; Copyright; Avail: Issuing Activity

Ductal adenocarcinoma of the pancreas accounts for approximately 90% of exocrine tumors, and is characteristically aggressive lesions. At the time of diagnosis, fewer than 10% of tumors are confined to the pancreas, and more than 95% of patients eventually die of their disease. The shortcomings of the existing treatments led to the study of alternative techniques. The use of radiofrequency ablation (RFA) of pancreatic adenocarcinoma was investigated. Using intraoperative ultrasound, tumors in the head of the pancreas were easily imageable, probes were inserted accurately, and the RF treatments were monitored in real-time. RFA is a promising new techniques for inducing a well-controlled focal area of necrosis in the head of the pancreas.
EI
Medical Science; Ablation; Imaging Techniques; Ultrasonics; Diagnosis; Tissues (Biology)

19980006198
Single session therapy of small hepatocellular carcinoma on cirrhosis using percutaneous radiofrequency interstitial thermal ablation
Giorgio, A., D. Cotugno Hospital, Italy; Tarantino, L.; Mariniello, N.; de Stefano, G.; Perrotta, A.; Aloisio, V.; Forestieri, M.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1414; In English; Copyright; Avail: Issuing Activity

Radiofrequency Interstitial Thermal Ablation (RITA) is a new technique for treatment of small (3 cm or less in diameter) Hepatocellular Carcinoma (HCC) on cirrhosis. RITA is obtained by insertion of a needle with electrodes on the tips inside the tumor, so that heat is generated in the tissue around the needle. We used a new needle with three or four terminal hooks on which tips a temperature around 100 C can be obtained, and a volume up to 14 cc of tumor can be ablated. If the tumor is around 2 cm in diameter, all the tumor is ablated together with a thin margin of non-neoplastic tissue. The aim of this study was to verify the efficacy of RITA in ablation of 3 cm or less HCC on cirrhosis in a single session. 12 cirrhotic pts (age 47-72 years, all males, all Child A class) with a single HCC nodule (diameter range: 1.9-2.7 cm) underwent a single session of RITA. 10 nodules were located at the centre of the right lobe of the liver and 2 nodules were located under the right liver surface. Under US guidance, RITA was performed in each pt in a single session, with only one passage using a 1.9 mm needle. Once positioned the needle tip in the tumor, three or four terminal hooks are extracted. Than the needle is connected to a radiofrequency generator ((RITA medical system inc., Mountain View, California) for 16 minutes. Efficacy of treatment was assessed with dynamic CT with c.m. performed 7 days after the procedure. In all cases the hospital stay was one day. 100% of necrosis was observed in all nodules. No complication occurred and the procedure was well tolerated from the patients. Liver function tests showed no variation the day after RITA session and during the follow-up (3 months). RITA is a safe and effective therapy in inducing complete necrosis in HCC nodules on cirrhosis 3 cm or less in diameter, in a single session. If experience on larger series of patients will prove its efficacy, we will have more possibilities (RITA, PEI, etc) to offer to cirrhotic pts with HCC.
Author (EI)
Medical Science; Ablation; Needles; Electrodes; Electronic Equipment; Medical Equipment

19980006201
Effect of contrast agent for the diagnosis of hepatocellular carcinoma on color Doppler imaging
Sakaguchi, Seigo, Fukuoka Univ., Japan; Tohara, Keiji; Miyajima, Yasushi; Tanaka, Masahiko; Mitsuyasu, Tomoko; Hatono, Nagafusa; Nakabayashi, Shouichi; Yao, Tsuneyoshi; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1801; In English; Copyright; Avail: Issuing Activity

Eleven patients with hepatocellular carcinoma (HCC) and 3 metastatic liver tumor were examined by Doppler immediately before and after intravenous injection of the contrast agent (Levovist, Shering AG, Germany). In HCC, hepatic arteriography (AG) and US under the injection of CO(sub 2) microbubbles into the hepatic artery (CO(sub 2)-US) were examined furthermore. In 5 of HCC, hypervascular tumor was detected neither on AG nor CO(sub 2)-US [Group-0]. And, it was detected in 1 of HCC only

on CO(sub 2)-US [Group-1] and in 5 on both [Group-2]. In Group-0 { size:M +/- SD; 1.2 +/- 0.2 cm}, Doppler signal (DS) was detected neither before nor after injection of Levovist. In Group-1 { 1.9}, only spotty DS (SS) was detected in the tumor before, but feeding DS (FS), thought to be a part of the feeding artery of HCC, were detected after. In Group-2 { 2.5 +/- 1.0}, DS was not detected before in 2 tumors, however, in both tumors FS was detected after. In other 3 of Group-2, SS was detected before and FS was detected after. In metastasis, after the injection, characteristic marginal SS of the tumor was detected. In conclusion, the intravenous injection of contrast agent was useful for the detection of characteristic FS and marginal SS for the diagnosis of liver cancer without angiographic Seldinger's technique.
Author (EI)
Imaging Techniques; Medical Science; Doppler Effect; Blood Vessels; Medical Equipment

19980006206
Portal blood flow in right-sided congestive heart failure
Yang, Sien-Sing, Natl. Taiwan Univ. Hospital, Taiwan, Province of China; Wu, Chi-Hwa; Chen, Paul H.; Chen, Ding-Shinn; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1207; In English; Copyright; Avail: Issuing Activity

We studied 20 patients with cardiovascular disorders. All patients had constant systemic blood pressure and body weight greater than 1 week prior to the study. Cardiac output (CO), left ventricular end-diastolic pressure (LVED), mean aortic pressure (AO), pulmonary wedge pressure (PW), mean pulmonary arterial pressure (PA), mean right atrial pressure (RA), right ventricular end-diastolic pressure (RVED) were recorded during cardiac catherization. Ten patients with RVED less than 10 mmHg were classified as group 1. The remaining 10 patients with RVED greater than 10 mmHg were classified as group 2. Portal profiles were studied using an ultrasonic Doppler within 12 h of cardiac catherization. Percentage of peak-to-peak pulsatility (PP) = (max. - min.)/max. frequency shift. CO, AO, and LVED were not different between two groups. Group 1 patients had normal PW (14.6 +/- 7.3 mmHg), PA (25.0 +/- 8.2 mmHg), RA (4.7 +/- 2.4 mmHg), and RVED (6.4 +/- 2.7 mmHg). Group 2 patients had increased PWP (29.9 +/- 9.3 mmHg), PA (46.3 +/- 13.2 mmHg), RA (17.5 +/- 5.7 mmHg), and RVED (18.3 +/- 5.6 mmHg) (P less than 0.001). Mean values of maximum portal blood velocity (Vmax), mean portal blood velocity (Vmean), cross-sectional area (Area) and portal blood flow volume (PBF) were not different between 2 groups. All group 1 patients had a continuous antegrade portal flow with a mean PP 27.0 +/- 8.9% (range: 17% to approximately 40%). All patients in group 2 had pulsatile portal flow with a mean PP 86.6 +/- 45.6 (range: 43% to approximately 94%). One patient had a transient stagnant and three patients had a transient hepatofugal portal flow, which occurred mainly during the ventricular systole. Vmax, Vmean and PBF had positive correlation with CO (P less than 0.001) but not with AO, LVED, PW, PA, RA, and RVED. PP showed a good correlation (P less than 0.001) with PW, PA, RA, and RVED but not with CO, AO, and LVED. Our data showed that severe right-sided heart failure may result in transient stagnant and hepatofugal portal blood flow. Reduced cardiac output results in decreased portal inflow.
Author (EI)
Blood Flow; Hemodynamics; Imaging Techniques; Ultrasonics; Medical Equipment; Pulses; Unsteady Flow; Blood Vessels

19980006208
Spectral changes in hepatic artery in patients with liver cirrhosis
Grigorov, N., Univ. Hospital 'Queen Joanna', Bulgaria; Nikolova, St.; Spaskov, Sp.; Golemanov, Br.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1218; In English; Copyright; Avail: Issuing Activity

A clinical study of 50 healthy persons and 110 prospective patients with liver cirrhosis, 32 of them in Child-Puch A, 48-in Child-Puch B and 20-in Child-Puch C has been carded out. 150 cm/s is accepted as an upper referent limit of the peak systolic velocity of a.hepatica com. and as an end diastolic one -40 cm/s. The normal RI values, according our investigations, are 0.75-0.50 and SAT less than 0.08 s. In the cirrhotics group, the pointed basic Doppler spectral parameters are changed in cases with portal hypertension and hyperdynamic blood flow in 88% (37/42) and retarded one in 63% (43/68). The arterial splanchnic network participates in the haemodynamical mechanisms of the portal hypertension. In order to categorize the parameters of the portal blood flow, besides the spleen enlargement and the change in the v.portae blood flow velocity, the parameters of a.hepatica in norm and pathology also should be used. The data confirm the angiographics in its different variations and add functional parameters, accessible by duplex Doppler ultrasonography. The impedance change occurs when there are enhanced peripheral resistance (decreased perfusion), poststenotic regions and retarded arterial blood flow. The multiplicity of the splanchnic arteriovenous system in norm and its adaptation to pathological changes is a theme, which is likely to be the subject of low-standing discussions.
Author (EI)
Blood Vessels; Imaging Techniques; Ultrasonics; Angiography; Hemodynamics

19980006213

Skinning modelling of the human body based on non-uniform B-spline

Li, Peng, Loughborough Univ. of Technology, UK; Sun, Weihong; Journal of China Textile University, English Edition; March, 1997; ISSN 1000-1484; Volume 14, no. 1, pp. 12-17; In Chinese; Copyright; Avail: Issuing Activity

This paper describes the surface modelling method of the human body based on non-uniform B-spline. Tensor-product form of B-spline surface is employed in computation of surface interpolation. It is efficient to reduce the raw data of the human body captured from 3D surface scanner. The surface model acquired provides a coherent representation to the raw data, so it is useful for 3D computer-aided clothing design.

Author (EI)

Human Body; Anthropometry; Computer Aided Design; Human Factors Engineering; Models

19980006214

Investigation of parameters of nonwoven filter used in white cells removing

Ke, Ginfei, China Textile Univ., China; He, Fumin; Journal of China Textile University, English Edition; March, 1997; ISSN 1000-1484; Volume 14, no. 1, pp. 38-42; In Chinese; Copyright; Avail: Issuing Activity

This paper is concerned with the relation between the parameters of nonwoven filter and the removing of white cells. Melt-blown polypropylene nonwovens are used as filtration materials of white cells filter. According to the combination of different fiber diameter, different product density and different weight, optimized combination of parameters of nonwoven filter with more effective removing of white cells is obtained. The result shows that the removing of white cells is 96.90 percent, recovery of red cells is 92.27 percent.

Author (EI)

Fabrics; Fluid Filters; Filtration; Blood; Polypropylene

19980006223

Correlation of ultrasonography and endoscopy in detection of inflammatory bowel disease (IBD)

Bru, C., Hospital Clinic, Spain; Sans, M.; Llach, J.; Gilabert, R.; Bordas, J. M.; Panes, J.; Pique, J. M.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1024; In English; Copyright; Avail: Issuing Activity

Assessment of disease extension has important prognostic and therapeutic implications in IBD, and relies basically on endoscopy. However, this technique may entail serious complications in cases of severe colitis. The objective of the present study is to determine the correlation of ultrasonography and endoscopy in detection of IBD lesions. 22 patients with active (n = 18) or inactive (n = 4) IBD were studied. 15 had Crohn's disease and 7 ulcerative colitis. All patients underwent ultrasonography after retrograde water instillation into the colon, and endoscopy on the same day. Investigators performing each test were blinded to the results of other test. Parameters measured at ultrasound were mucosal and total wall thickness, preservation of wall layers and haustra; alterations in any of these parameters was considered as ultrasonographic evidence of disease. Each segment of colon (rectum, sigmoid; descending, transverse and ascending) was assessed separately, and overall sensitivity and specificity were calculated as the mean of all segments. Ultrasonography could visualize the colon from ascending to sigmoid region in all patients; however, the rectum was adequately visualized in only 6 (27%) patients. Overall sensitivity and specificity of ultrasonography relative to endoscopy were 86% and 93%, with a positive predictive value of 89% and negative predictive value of 91%. of the 4 false negative assessments of ultrasonography, three were ulcerative colitis cases with disease limited to the rectum and lower 10 cm of the sigmoid colon. Ultrasonography of the fluid-filled colon is a suitable method for the assessment of IBD extension. However, assessment of disease activity in the rectosigmoid region is better performed by endoscopy.

Author (EI)

Imaging Techniques; Medical Equipment; Ultrasonics; Endoscopes; Diseases; Thickness

19980006232

Flow pattern in the right hepatic vein reflects fatty infiltration of the liver in patients with chronic hepatitis C

Dietrich, Christoph F., Univ. Hospital, Germany; Stryick-Kaminska, Danuta; Braden, B.; Caspary, Wolfgang F.; Herrmann, Guenter; Zeuzem, Stefan; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMO 1205; In English; Copyright; Avail: Issuing Activity

The flow pattern in hepatic veins depends on cardiac physiology and liver histology. Aim of the present study was to determine the dependance of the flow pattern in relation to histology in HCV-infected patients with normal cardiac function. In 114 patients with chronic hepatitis C (pHCV, 71 male, 43 female; 39 +/- 9 years [range: 20-59]) and 75 healthy controls (hc, 47 male, 28 female; 37 +/- 9 years [range: 26-66], no histology), the Doppler spectrum was evaluated in the right hepatic vein (V 328, Acuson 128, 3.5 MHz). The flow pattern was classified as triphasic (tp), biphasic (bp), or monophasic (mp). At the same occasion

liver biopsy was performed. Histology was classified according to the histology activity index (HAI) and the hepatic fat content was semiquantitatively evaluated. of all histological parameters, the hepatic fat content was best correlated with the flow pattern in the right hepatic vein. In pHCV, no or only slight fat deposition in the hepatocytes was found in 73/114 (64.0%) and fatty infiltration in 41/114 (36.0%). In pHCV with minimal fat deposition the flow pattern was mp in 2/73 (2.7%), bp in 17/73 (23.3%), and tp in 54/73 (74.0%). In contrast, in pHCV with significant fat deposition the flow pattern was mp in 37/41 (90.2%), bp in 2/41 (4.9%), and tp in 2/41 (4.9%). In hc the flow pattern was mp in 12/75 (16.0%), bp in 7/75 (9.3%), and tp in 56/75 (74.7%). The normal flow pattern in the right liver vein is triphasic, rarely mono- or biphasic. Fatty infiltration of the liver in patients with chronic hepatitis C is best related to monophasic flow pattern and less related to fibrosis. No strong correlation of the flow pattern with the degree of portal inflammation, necrosis, or cirrhosis was observed.
Author (EI)
Flow Distribution; Hemodynamics; Imaging Techniques; Medical Equipment; Blood Vessels

19980006248
Anatomical variations of penile arterial structures studied with Color Doppler
Pavlica, Pietro, Hospital M.Malpighi, Italy; Barozzi, Libero; Koremblit, Norman; Vitali, Giovanni; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUO 2453; In English; Copyright; Avail: Issuing Activity

Anatomical studies, confirmed by angiographical ones, have shown great variability in number and subdivision of the cavernous artery in its penile tract. These anatomical variables are recognizable during Color-Doppler exam for impotence. The aim of the study was to analyze the incidence of anomalies in the number of cavernous arteries in all patients referred to us for observation. The study was performed prospectively in 74 consecutive patients submitted to Color-Doppler for erectile dysfunction. All underwent drug stimulation with intracavernous injection of 20 mcg of PGE1. The exam was performed with a Color-Doppler machine using a 7.5 MHz linear probe (ESAote, Genova, Italy). Number anomalies were detected in 14 subjects (19%) with unilateral anomalies in 13 and bilateral in 1. The most common variant was duplication of the cavernous artery, especially evident at the root of the penis. In one patient we observed the presence of three arteries. Spectral analysis showed in all cases a wave equal in both vessels and sequential functional behavior that was symmetrical with the contralateral side. The cavernous artery often presents variability as to origin, course and number. Color-Doppler has proved a sensitive method for identifying number anomalies even if in our experience drawn from patients preselected for impotence, the incidence was only 19% of the subjects studied, compared to 75% incidence detected with accurate anatomical studies. On the basis of current knowledge, it is not possible to clearly say what the clinical importance of these number variants in the physiopathology of the erection might be.
Author (EI)
Blood Vessels; Imaging Techniques; Medical Equipment; Drugs; Neural Nets; Stimulation; Spectrum Analysis

19980006249
Ultrasonography and magnetic resonance in fibrosis of corpora cavernosa
Barozzi, Libero, Hospital M.Malpighi, Italy; Pavlica, Pietro; Balzani, Elisabetta; Basunti, Giuseppe; Menchi, Ilario; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUO 2452; In English; Copyright; Avail: Issuing Activity

Fibroses of the corpora cavernosa can be either primary or secondary. While primitive forms are exceptional, secondary forms are mainly a consequence of trauma, priapism or self-injection of drugs. The aim of the study was to evaluate the diagnostic possibilities of US and MR in dynamic phase. The study included 10 patients: 3 with self-injected drug fibrosis, 3 with prolonged priapism and 4 following trauma. All patients underwent ultrasonography with a 7.5 MHz linear probe and MR with a 0.5 T system and surface coil. Sonography detected all lesions while MR missed one case of a small size focal fibrosis following pharmacological self-injection. MR however allowed better staging of post-priapic and post-traumatic diffuse fibrosis on account of better contrast resolution. Sonography is the examination of choice for fibrosis of the corpora cavernosa. MR is indicated in cases of clinical-ultrasonographic discrepancy when the extent and gravity of clinical lesions cannot be confirmed by ultrasound findings because of reduced contrast resolution.
Author (EI)
Magnetic Resonance; Imaging Techniques; Medical Equipment; Ultrasonics; Diagnosis

19980006250
Preliminary results of power Doppler imaging in benign prostatic hyperplasia (BPH)
Iida, Akio, Kyoto Prefectural Univ. of Medicine, Japan; Kojima, Munekado; Watanabe, Wakoto; Okihara, Koji; Naya, Yoshio; Azuma, Yutaroh; Watanabe, Hiroki; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. NUO 2913; In English; Copyright; Avail: Issuing Activity

Recent advancement of power Doppler imaging has greatly improved the ability to detect and analyze Doppler signals from small blood vessels in organs. In this study, this new technique was applied transrectally to the prostate, and preliminary results were reported, comparing Doppler parameters between BPH and a normal prostate. Power Doppler imaging was performed in 100 patients (n = 50: normal prostate, n = 50: BPH). In 10 BPH patients, Doppler parameters were compared before and after surgery. Pulsatile blood flows were detected in all patients. Most remarkable was the significant increase (p less than 0.0001) of the resistive index (RI) in BPH (0.72 +/- 0.05), compared to a normal prostate (0.64 +/- 0.04). Out of 50 patients with BPH 35 (70%) had an RI greater than or = 0.7, while 48 patients out of 50 (96%) with normal prostate had an RI less than 0.7 (p less than 0.0001). In all 10 patients with BPH, the elevated RI decreased significantly to a normal conafter surgical treatment (0.72 +/- 0.02 vs 0.64 +/- 0.05 p less than 0.001). These results suggest that Doppler RI could be used as a new urodynamic parameter in the investigation of BPH.
Author (EI)
Imaging Techniques; Medical Equipment; Medical Science; Doppler Effect; Signal Detection; Blood Vessels

19980006256

Splanchnic and systemic hemodynamic response to meal in cirrhotics with different bleeding risk

Gaiani, S., Universita di Bologna, Italy; Piscaglia, F.; Siringo, S.; Gramantieri, L.; Donati, G.; Valgimigli, M.; Bolondi, L.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1211; In English; Copyright; Avail: Issuing Activity

Meal ingestion induces a temporary drop of intestinal arterial impedance and a consequent higher intestinal blood outflow to the liver. to investigate the presence and the magnitude of such changes in portal hypertension, we evaluated postprandial splanchnic hemodynamics in 32 cirrhotic patients (19 males; 5 pts without varices, 12 with F1 varices, 10 F2 and 5 F3; 15 in Child-Pugh A class, 14 in B and 3 in C) and 7 healthy volunteers (4 m). At baseline, in a fasting state, and at 30, 60, 120 minutes after a standard meal we measured, by duplex-Doppler, the following parameters: heart rate, portal vein caliber and flow velocity and SMA-RI. Results are summarized in a table. The intestinal arterial impedance decreases during the digestive phase in all groups, confirming that the postprandial intestinal inflow increase is present even in the highest bleeding risk (BR) patients. The corresponding flow increase in the portal vein is still present only in healthy and in low-moderate BR patients, while it is completely abolished in high BR patients. In these latter patients increased intrahepatic resistances prevent any further flow increase within the liver and the postprandial overflow is likely to be drained into the collateral vessels. High BR cirrhotic patients show different postprandial hemodynamic patterns with respect to healthy subjects and to low-moderate BR patients and should therefore be considered separately in regard to pathophysiological and pharmacological studies.
Author (revised by EI)
Hemodynamic Responses; Hemodynamics; Patients; Blood Vessels; Physiology; Medical Science

19980006257

Effect of exercise load on hepatic blood flow in patients with chronic liver disease

Sato, Yumiko, Kihoku Hospital, Japan; Sato, Hiroaki; Funasako, Masato; Ohata, Masahiro; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1209; In English; Copyright; Avail: Issuing Activity

We measured portal blood flow by color Doppler ultrasonography before and after exercise ranged from 50% to 55% or from 60% to 65% of the maximal heartrate was added in patients with chronic liver diseases and analyzed information on hepatic blood flow during exercise using indocyanine green (ICG) test. There were no decreases in portal blood flow after exercise maintaining 50 to 50% maxHR in the NC, CH, or LC groups. Portal blood flow after exercise maintaining 60 to 65% maxHR was decreased to 80% of that at rest in the NC and CH groups. The vascular sectional area was significantly decreased after exercise maintaining 60 to 65% maxHR and portal blood flow may be regulated by changes in vascular sectional area. There was no delayed recovery of portal blood flow after completing exercise maintaining 60 to 65% maxHR in the CH group. Nextly we measured hepatic blood flow at rest, during walking and in the standing position using ICG test in patients with CH. Hepatic blood flow during exercise maintaining 50 to 55% maxHR was increased compared to that at rest or in the standing position. Exercise maintaining 50 to 55% maxHR may not decrease hepatic blood flow in patients with chronic liver disease.
Author (EI)
Blood Flow; Loads (Forces); Physical Exercise; Hemodynamics; Imaging Techniques; Ultrasonics; Medical Equipment; Diseases

19980006258

Analysis of blood flow signals in hepatocellular carcinoma using ultrasound Doppler method

Kamihira, Masakazu, Jichi Medical Sch., Japan; Futamura, Mitsugi; Yamanaka, Takeo; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1208; In English; Copyright; Avail: Issuing Activity

The acceleration time index (ATI) of blood flow signals on hepatocellular carcinoma (HCC) patients was assessed. The assessment was conducted at the borderline-area and the central area of HCC, main hepatic artery, and the second blanch of artery. ATI of central area increased more than that of other arteries. ATI of the borderline-area also increased more than that of main artery and the second blanch. Hence, ATI is useful in the diagnosis of HCC.

EI

Blood Flow; Hemodynamics; Imaging Techniques; Ultrasonics; Medical Science; Medical Equipment; Blood Vessels

19980006260

Regenerating nodules in cirrhosis: Sonographic-pathologic correlation

Lim, Jae Hoon, Samsung Medical Cent., Republic of Korea; Kim, Eung Yeop; Choi, Dongil; Park, Cheol Keun; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. IMP 1021; In English; Copyright; Avail: Issuing Activity

To define sonographic appearances of regenerating nodules in cirrhosis, we undertook a sonographic-pathologic correlation study. Sonograms of five resected noncirrhotic livers and ten resected cirrhotic liver specimens were obtained by using 2-4 MHz and 5-10 MHz broadband transducers. The presence of focal lesions in the sonograms were investigated by two radiologists without pathologic information and correlated with pathological specimens. by using 5-10 MHz transducers, majority of regenerating nodules were depicted as ill-defined or well-defined hypoechoic focal lesions surrounded by complete or incomplete hyperechoic fibrous rim. by using 2-4 MHz transducers, regenerating nodules larger than 6 mm were depicted as hypoechoic focal lesions whereas nodules smaller than 5 mm were not depicted clearly but produce inhomogeneous, increased echogenicity and coarsening of the parenchymal echotexture depending on the amount of fibrous septae surrounding regenerating nodules. It is concluded that, in routine abdominal sonography by using 2-4 MHz transducers, regenerating nodules larger than 6 mm can be depicted but nodules less than 5 mm produce increased and coarse hepatic echotexture.

Author (EI)

Imaging Techniques; Medical Equipment; Ultrasonics; Ultrasonic Wave Transducers

19980006297 Technische Univ., Dept. of Microbiology and Enzymology, Delft, Netherlands

Sulfur Compound Oxidation and Sulfur Production by 'Thiobacillus' sp. W5

Visser, J. M., Technische Univ., Netherlands; May 13, 1997; 116p; In English

Report No.(s): PB97-196471; Copyright Waived; Avail: CASI; A06, Hardcopy; A02, Microfiche

Contents include the following: General introduction; thiobacillus sp. W5, the dominant autotroph oxidizing sulfide to sulfure in a reactor for aerobic treatment of sulfidic wastes; sulfur production by obligately chemolithoautotrophic Thiobacillus species; a novel membrane-bound flavocytochrome c sulfide dehydrogenase sulfur bacterium Thiobacillus sp. W5; purification and characterization of a periplasmic thiosulfate dehydrogenase from the obligately autotrophic Thiobacillus sp. W5; cbb3-type cytochrome oxidase in the obligately chemolithoautotrophic Thiobacillus sp. W5; concluding remarks; and summary.

NTIS

Degradation; Sulfur; Sulfur Compounds; Oxidation; Microorganisms

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19980003879 Advisory Group for Aerospace Research and Development, Aerospace Medical Panel, Neuilly-Sur-Seine, France

Impact Head Injury: Responses, Mechanisms, Tolerance, Treatment and Countermeasures *Les Traumatismes Craniens Consecutifs aux Impacts: Les Mecanismes, la Tolerance, le Traitement et les Contremesures*

Nov. 1997; 242p; In English; Impact Head Injury: Responses, Mechanisms, Tolerance, Treatment and Countermeasures, 7-9 Nov. 1996, Mescalero, NM, USA; Also announced as 19980003880 through 19980003902

Report No.(s): AGARD-CP-597; ISBN 92-836-1062-8; Copyright Waived; Avail: CASI; A11, Hardcopy; A03, Microfiche

These proceedings include the Technical Evaluation Report, a Keynote Address, and 23 invited papers, of the Specialists' Meeting sponsored jointly by the AGARD Aerospace Medical Panel, the Stapp Car Crash Conference Advisory Committee and

the Society of Automotive Engineers. Severe head injury resulting from vehicular accidents is a major concern to military and civilian health care workers. Significant advances have been made in the understanding of the causes of severe brain injury and in the factors, both direct and indirect, that contribute to the pathophysiological changes that follow from a severe head injury. Moreover, advances in design and the proper use of countermeasures can significantly reduce head injuries causing death. This Specialists' Meeting addressed the issues of severe head injury from the point of view of: (a) the dynamic response of the head during impacts; (b) brain injury mechanisms in diffuse axonal injury; (c) physical and computer models for assessing injury severity; (d) human tolerance and injury criteria; (e) head injury assessment and treatment; (f) epidemiology in head injury mishaps; (g) harmonization and enforcement of standards for protective head gear; (h) personal protective systems in aircraft; and (i) computer simulations for optimizing head impact protective designs. These proceedings will be of interest to military and civilian medical professionals, accident investigators, safety engineers and research scientists concerned with safety issues in vehicular crash protection. They will also benefit the research manager and scientist or flight surgeon requiring a state-of-the-art review of relevant research in the field of impact head protection.
Author
Conferences; Countermeasures; Crashes; Dynamic Response; Head (Anatomy); Human Tolerances; Crash Injuries; Brain Damage; Damage Assessment; Biodynamics; Impact Damage; Impact Resistance; Impact Tests; Physiological Effects

19980003880 Heidelberg Univ., Heidelberg, Germany
Some Observations to the Skull-Brain Trauma
Kallieris, Dimitrios, Heidelberg Univ., Germany; Rizzetti, Andreas, Heidelberg Univ., Germany; Mattern, Rainer, Heidelberg Univ., Germany; Impact Head Injury: Responses, Mechanisms, Tolerance, Treatment and Countermeasures; Nov. 1997; 4p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A01, Hardcopy; A03, Microfiche

Skull-brain injuries are caused through impact against rigid or padded obstacles. Injury pattern and injury severity of skull-brain trauma from experimental head impacts and autopsy cases are reported. The experimental part includes 10 head impacts (frontal, lateral or occipital and rigid or padded) with cadavers at a velocity of 20 km/h. A pneumatic impactor with a movable mass of 23 kg was used, the impact surface was a disc with 150 mm of diameter. Accelerations at the top of the head and the epidural pressure at the contrecoup site were measured. According to the acceleration measurements at the top of the head c.g. amounts between 85 g (padded) and 500 g (rigid); the rotational acceleration of the head around the rotation axis varies between 4700 rad/sec(sup 2) (padded) and 19000 rad/sec(sup 2) (rigid). Furthermore, the epidural pressure is between -20 kPa and -46 kPa. The observed fracture pattern and the injury severity of the skull are well comparable between the experimental exposure and the head impact during a sudden fall on the road. Furthermore, the injury pattern of the brain is also comparable, however, not the injury severity; the haematoma is of higher intensity in the accident cases. The brain injuries of the experiments include contrecoup subarachnoidal haematomas; furthermore skin lacerations were observed. The results are critically discussed with those existing in the literature.
Author
Impact Damage; Impact Tests; Head (Anatomy); Human Tolerances

19980003881 Medical Coll. of Wisconsin, Dept. of Neurosurgery, Milwaukee, WI USA
Impact Biodynamics of Human Skull Fracture
Sances, Anthony, Jr., Medical Coll. of Wisconsin, USA; Yoganandan, Narayan, Medical Coll. of Wisconsin, USA; Pintar, Frank A., Medical Coll. of Wisconsin, USA; Kumaresan, Srirangam, Medical Coll. of Wisconsin, USA; Walsh, Patrick R., Medical Coll. of Wisconsin, USA; Nov. 1997; 6p; In English; Also announced as 19980003879; Sponsored in part by George Snively Memorial Foundation
Contract(s)/Grant(s): DTNH22-93-Y-17028; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

The purpose of the present study was to determine the force-deflection biomechanics of the human cadaveric intact head under quasistatic and dynamic loading. Both nonfracture and fracture studies were conducted under known boundary conditions to delineate the stiffness, energy, and force-deflection characteristics for future use in finite element investigations and helmet protection studies.
Author
Biodynamics; Head (Anatomy); Impact Tests; Human Tolerances; Impact Damage; Damage Assessment; Human Factors Engineering

19980003882 Duke Univ., Dept. of Biomedical Engineering, Durham, NC USA
Basilar Skull Fracture Resulting From Compression Neck Loading
Myers, Barry S., Duke Univ., USA; Richardson, William J., Duke Univ., USA; Nightingale, Roger W., Duke Univ., USA; Nov. 1997; 10p; In English; Also announced as 19980003879; Sponsored in part by Virginia Flowers Baker Chair

Contract(s)/Grant(s): R49/CCR402396-10; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

A cadaver head and neck impact model has been developed to produce a wide variety of clinically observed cervical spine injuries and basilar skull fractures. The impact model includes a drop track which allows impact of the head and neck with a simulated torso mass following into an obliquely oriented surface with varying amounts of surface padding. Twenty unembalmed ligamentous cadaver head-neck specimens have been dropped in an inverted posture with the head and neck in the anatomically neutral position. Multiaxis transduction recorded head impact forces, planar head accelerations, and neck reactions. In addition, the impact tests were imaged using a high speed imaging system at 1000 frames. The head-neck-torso response was bimodal, including a head inertial loading mode followed by a neck-impact surface loading mode. A total of three basilar skull fractures were produced among 16 specimens suffering injuries, one in an impact to a rigid surface, and two in impacts to padded surfaces. Additionally, each of these injuries occurred in the neck-impact loading mode and were therefore unrelated to peak head impact force, or head acceleration. These data suggest that these injuries may occur with greater frequency than previously thought. They also suggest that some basilar skull fractures occur mechanistically like neck injuries and are not likely to be mitigated with the addition of impact surface padding.

Author

Impact Tests; Skull; Impact Damage; Human Tolerances; Damage Assessment; Human Factors Engineering; Spine

19980003883 Pennsylvania Univ., Dept. of Bioengineering, Philadelphia, PA USA

The Role of Kinetic Loading Parameters on the Severity of Diffuse Axonal Injury in Closed Head Injury

Miller, R. T., Pennsylvania Univ., USA; Smith, D. H., Pennsylvania Univ., USA; Han, X., Pennsylvania Univ., USA; Xu, B., Pennsylvania Univ., USA; McIntosh, T. K., Pennsylvania Univ., USA; Meaney, D. F., Pennsylvania Univ., USA; Nov. 1997; 8p; In English; Also announced as 19980003879; Sponsored in part by Ashton Fellowship

Contract(s)/Grant(s): R49/312712; NIH-NS-08803; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

In this report, we describe relationships between the kinetic loading parameters and the incidence of axonal injury in an experimental model of diffuse axonal injury used in our laboratory. Twenty animals (Hanford miniature pig, 13-20 kg, 3-4 months old) were injured using a coronal plane rotational acceleration of the head. Both the magnitude of angular acceleration and change in angular velocity were varied in these tests over a controlled range (56-260 krad/s(sup 2); 174-472 rad/s). Seven days following injury, injured brains were examined using immunocytochemical markers for injury (NF200, SMI-3, and SMI-32) and maps of both the axonal injury distribution and severity were produced for selected coronal planes. Analysis of these injury maps revealed that the extent of injury in the mid-hippocampal plane was reasonably correlated to kinetic loading parameters (R=.66,.76), but that the correlations were less strong when focusing on specific intensities of axonal injury. Additionally, the severity of axonal injury in a given location, correlated to the loading parameters, but the changes were not statistically significant. Together, this study forms an important starting point for relating load parameters to injury within the brain, and can likely be improved with more advanced computational modeling capabilities.

Author

Axons; Brain Damage; Damage Assessment; Head (Anatomy); Impact Tests; Impact Damage

19980003884 Pennsylvania Univ., Dept. of Bioengineering, Philadelphia, PA USA

In Vivo Mechanical Thresholds for Traumatic Axonal Damage

Bain, Allison C., Pennsylvania Univ., USA; Billiar, Kris L., Miami Univ., USA; Shreiber, David I., Pennsylvania Univ., USA; McIntosh, Tracy K., Pennsylvania Univ., USA; Meaney, David F., Pennsylvania Univ., USA; Nov. 1997; 12p; In English; Also announced as 19980003879

Contract(s)/Grant(s): NIH-NS-08803; Copyright Waived; Avail: CASI; A03, Hardcopy; A03, Microfiche

A methodology to identify tissue level axonal stress and strain from macroscopic parameters is outlined. A non-linear, viscoelastic, structural relationship is proposed to describe the in vivo response of the guinea pig optic nerve to uniaxial elongation. The optic nerve is modeled as a bundle of parallely aligned axons undulated to varying degrees. When straightened, each axon displays non-linear, viscoelastic behavior that contributes to the overall behavior of the optic nerve. Optic nerves were examined microscopically to calculate the undulation of individual axons. Axonal undulation was found to follow a gamma distribution, with a mean undulation of 1.070 and a standard deviation of 0.053. A reduced relaxation function, consisting of two exponential terms, was approximated from in vivo, dynamic elongation of the guinea pig optic nerve. Results from the in vivo relaxation tests indicated that the relaxation behavior was independent of displacement, a requirement for linear, viscoelastic theory based on hereditary integrals. The instantaneous elastic function was expressed as an integral of the undulation distribution and a function of the stretch ratio. Initially, a linear stretch ratio function was assumed to analyze the effects of the undulation distribution on the instan-

taneous elastic response. These results were compared with those obtained by increasing the order of the stretch ratio function to a third order polynomial. The computed results of the proposed structural relationship compared well to the experimental data from in vivo optic nerve tests, indicating that this model could provide a framework for identifying axonal thresholds for traumatic injury.
Author
Axons; Nerves; Damage Assessment; Models; Brain Damage

19980003885 Chrysler Corp., Auburn Hills, MI USA
Modeling Cavitation during Head Impact
Nusholtz, Guy, Chrysler Corp., USA; Glascoe, Lee G., Michigan Univ., USA; Wylie, E. Benjamin, Michigan Univ., USA; Nov. 1997; 12p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A03, Hardcopy; A03, Microfiche

The effects of stress in brain material was investigated with experimental and computational idealizations of the head. A water-filled cylinder impacted by a free traveling mass serves to give insight into what could happen to the brain during impact; particularly the effect of the state of stress on possible physical changes in the brain material. When the cylinder is struck by a free-flying mass of sufficient velocity, cavitation is initiated at the boundary opposite impact. Significant vaporous regions may develop at the boundary, while only limited vaporization occurs internally. The vaporization that does occur internally consists of diffuse micro-voids. Higher accelerations, or an additional loading of the domain by a constant acceleration perpendicular to impact, adds to the likelihood and to the increased severity of internal cavitation, increasing the size, number and density of micro-voids. As a result, the micro-voids that form may not only produce injuries in the typically perceived cavitation damage response, i.e., violent cavity collapse, but also by producing local large strains as a result of cavity formation. In addition, when a local section of brain is significantly populated with micro-voids, the bulk and shear properties can change. Therefore, cavitation-caused cellular damage, including a non-violent collapse mechanism resulting from stress in the brain material might be more common than previously thought. Cavitation occurred in these experiments at accelerations greater than 150 g's.
Author
Impact Damage; Damage Assessment; Head (Anatomy); Brain Damage; Mathematical Models; Cavities

19980003886 Wayne State Univ., Bioengineering Center, Detroit, MI USA
Head Injury Assessment of a Real World Crash by Finite Element Modeling
Zhou, Chun, Wayne State Univ., USA; Khalil, Twafik B., Wayne State Univ., USA; King, Albert I., Wayne State Univ., USA; Dragovic, Ljubisa J., County of Oakland, USA; Nov. 1997; 8p; In English; Also announced as 19980003879
Contract(s)/Grant(s): R94/CCR503534-07; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

This paper demonstrates the potential of the WSU (Wayne State University) Brain Injury Model in predicting brain injuries sustained in a real motor vehicle crash. The particular case simulated here was a side impact in which the victim succumbed to multiple injuries, including a severe brain injury. The first step in the process was to use the EDSMAC code to obtain gross vehicular kinematics. The output of the EDSMAC run was used as input to a MADYMO simulation of the occupant kinematics and interaction with the vehicular structures of both the struck and striking vehicles. The computed head acceleration was then applied to the new three-dimensional finite element model of the head to determine the response of the brain to this crash loading. The injury severity was assessed by identifying areas of high shear strain and comparing them with autopsy data that showed locations of petechial hemorrhage where diffuse axonal injury (DAI) presumably occurred. The crash reconstruction revealed a possible head contact with the hood of the striking vehicle, even though no signs of contact were seen on the head at autopsy. The estimated resultant linear acceleration was about 220 g's. The estimated lateral angular acceleration was about 20,000 rad/s(sup 2). The estimated sagittal angular acceleration was about 11,000 rad/s(sup 2). Better estimation could have been made if more information were available. The shear strain distribution within the brain exhibited some degree of correspondence with the sites of DAI. It is very promising that the shear stress contours can be used to make predictions of DAI.
Author
Three Dimensional Models; Brain Damage; Human Tolerances; Impact Damage; Damage Assessment; Crash Injuries; Head (Anatomy)

19980003887 General Motors Corp., Safety Research Dept., Warren, MI USA
Tissue Level Injury Criteria using Brain Finite Element Analysis, Bilateral Impact Model
Ueno, Kazunari, General Motors Corp., USA; Melvin, John W., General Motors Corp., USA; Nov. 1997; 16p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A03, Hardcopy; A03, Microfiche

A finite element model of a cortical impact experiment following double craniotomy was built and exercised independently with three different finite element programs, i.e., Dyna3d, Pamcrash and Abaqus as a partial validation of the protocol in establish-

ing tissue level injury criteria for the head/brain subjected to an impact load. A typical experimental impactor motion (4 mm displacement in 1.5 ms, 5 m/s initial velocity) was successfully simulated in all programs and the results were favorably compared to each other in terms of overall stress values, time histories and distributions. The peak Von-Mises stress (120 kPa) was observed in the depth of the brain while the pressure peak (160 kPa) was observed at the surface of the brain. Both pressure and Von-Mises stress wave propagations were in accord with the theoretical wave speeds. The explicit programs (Dyna3d and Pamcrash) have a 600 fold CPU advantage and a smoother stress response compared to the implicit program (Abaqus).
Author
Finite Element Method; Mathematical Models; Crash Injuries; Brain Damage; Head (Anatomy); Applications Programs (Computers)

19980003888 National Highway Traffic Safety Administration, Washington, DC USA
Use of Finite Element Analysis and Dummy Test Measurements in the Assessment of Crash Impact Traumatic Brain Injury
Bandak, F. A., National Highway Traffic Safety Administration, USA; Tannous, R. E., George Washington Univ., USA; Eppinger, R. H., National Highway Traffic Safety Administration, USA; Toridis, T., George Washington Univ., USA; DiMasi, F., Federal Aviation Administration, USA; Zhang, A. X., Conrad Technologies, Inc., USA; Nov. 1997; 14p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A03, Hardcopy; A03, Microfiche

Three computational models were used to interpret experimental data as a first step in developing a process to predict traumatic brain injury (TBI) potential in motor vehicle crashes. The process and the prevailing conditions limiting its current viability are discussed. The first model, a two dimensional model of the miniature pig brain, was gauged against existing experimental data using a previously introduced Cumulative Strain Damage Measure (CSDM). Results from this model were utilized in the analysis of output from two simple three dimensional models of the human brain one representing an adult and the other scaled in a crude attempt to simulate the six year old child brain. The miniature pig computer model was subjected to loads identical to those used in existing brain injury experiments. The human models were loaded using measured kinematic response data from actual crash dummy tests. The dummy test data was converted to model loadings using a previously reported method and a new experimental technique for measuring the spatio-temporal distribution of pressure resulting from head impact is also introduced. Twelve cases were analyzed using the two human finite element models. Six involved the Hybrid III dummy and six involved the six year child version of the dummy. The crash test results were evaluated on the basis of several proposed finite element based brain damage measures as well as the values of the Head Injury Criterion. Preliminary results indicate that the proposed procedure is feasible for the assessment of head injury potential pending the availability of material data and consistent load measurement processes.
Author
Brain Damage; Crash Injuries; Finite Element Method; Three Dimensional Models; Head (Anatomy); Impact Tests; Impact Damage; Damage Assessment

19980003889 General Motors Corp., Safety Center, Warren, MI USA
Head Injury Risk Assessments Based on 15 MS HIC and Peak Head Acceleration Criteria
Mertz, H. J., General Motors Corp., USA; Prasad, P., Ford Motor Co., USA; Nusholtz, G., Chrysler Corp., USA; Nov. 1997; 10p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

A review is given of the development of the Head Injury Risk Curve (HIRC) which is based on 15 ms HIC, and the Skull Fracture Risk Curves (SFRC) which are based on the 15 ms HIC and the Peak Head Acceleration criteria respectively. Each of the risk curves was developed by analyzing the relevant cadaver head impact data using the Mertz/Weber Method which is a simplified form of the Median Rank technique. The Mertz/Weber Method was used to estimate the injury risk to the adult driving population because the test samples of cadavers were biased with specimens having poorer bone conditioning factors than the driving population. The Mertz/Weber Method is not affected by this type of bias since the form of the distribution curve is assumed apriori. The efficacy of the Head Injury Risk curve is demonstrated by noting that the predicted reduction in head injuries due to certification of American football helmets based on the HIRC was 78 percent compared to the actual reduction in head injury risk of 74 percent. The efficacy of the Skull Fracture Risk Curve based on 15 ms HIC is demonstrated using a finite element model of the head. There was no agreement between model results and the SFRC based on peak head acceleration since the time-dependency associated with bone failure is not addressed by the Peak Head Acceleration criterion. This limitation of the Peak Head Acceleration criterion is demonstrated by analyzing Transport Canada's 30 mph rigid barrier vehicle test results. Assuming a 5 percent risk of skull fracture as a design limit, then 20 tests would fail to meet this limit based on the 15 ms HIC criterion, but only 10 tests would fail based on the Peak Head Acceleration criterion. Further, it is noted that the proposed 80 G limit for Peak Head

Acceleration is very design restrictive since it represents a 0.1 percent risk of skull fracture. The corresponing 15 ms HIC value for this level of skull fracture risk is 100.
Author
Head (Anatomy); Injuries; Risk

19980003890 Cambridge Univ., Cambridge, UK
Complementary Role of Functional Brain Imaging and Multi-Modality Bedside Monitoring for Acute Brain Injury: Pathophysiology and Surrogate End Points
Pickard, John D., Cambridge Univ., UK; Kirkpatrick, Peter J., Cambridge Univ., UK; Czosnyka, Marek, Cambridge Univ., UK; Menon, David, Cambridge Univ., UK; Minhas, Parvan, Cambridge Univ., UK; Smielewski, Peter, Cambridge Univ., UK; Clark, John, Cambridge Univ., UK; Herrod, Nick, Cambridge Univ., UK; Carpenter, Adrian, Cambridge Univ., UK; Downey, Stephen, Cambridge Univ., UK; Kendall, Iona, Cambridge Univ., UK; Nov. 1997; 4p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A01, Hardcopy; A03, Microfiche

This paper reviews the advances in management of non missile head injury over the past 30 years, and the factors known to affect outcome. It has proven difficult to exploit recent advances in the development of novel neuroprotective agents in patients with head injury and the reasons are explored together with the emerging role of multi-modality bedside monitoring and functional brain imaging (Positron Emission Tomography and Magnetic Resonance) in defining more homogeneous sub-groups of patients for more focussed trials of such novel agents.
Author
Brain Damage; Imaging Techniques; Injuries; Damage Assessment; Head (Anatomy)

19980003891 Armstrong Lab., Neuropsychiatry Branch, Brooks AFB, TX USA
Closed Head Injury and the Military Aviator: Assessing Cognitive Dysfunction and Seizure Risk
Drew, William E., Armstrong Lab., USA; Patterson, John C., Armstrong Lab., USA; Nov. 1997; 4p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A01, Hardcopy; A03, Microfiche

Over the last several years, two concerns have become evident with respect to the aeromedical disposition of aviators following closed head injuries. The first problem is that aviators, even with mild closed head injuries, often have subtle cognitive impairment. This impairment is often not apparent on clinical examination or cursory mental health evaluation such as the Folstein Mini-Mental State Examination. The second problem is the risk of post-traumatlc seizures primarily in aviators with moderate or severe closed head injuries. Both of these conditions clearly are problematic for the flying population in terms of information processing and sudden incapacitation. As task saturation poses a problem for individuals with the highest levels of cognitive functioning and psychomotor skills, i.e., "Top Guns", any cognitive impairment, to include cognitive slowing, poses a risk for flying safety. Clearly, sudden incapacitation, such as those resulting from post-traumatic seizure are incompatible with flying safety as well. An important aspect of closed head injury in occupational and aerospace medicine is the classification. Based on this classification, a research program has been developed to further study head injury as it relates to aeromedical disposition.
Author
Aircraft Pilots; Head (Anatomy); Physiological Effects; Risk; Cognition; Crash Injuries; Damage Assessment; Seizures

19980003892 Wayne State Univ., School of Medicine, Detroit, MI USA
Secondary Injury After Severe Traumatic Brain Injury: Mechanisms Toward Which Clinical Trials Are Targeted
Muizelaar, J. Paul, Wayne State Univ., USA; Nov. 1997; 4p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A01, Hardcopy; A03, Microfiche

In this paper, we cite literature showing that after traumatic brain injury (TBI) much of the damage is done well after the impact, even though the morphological appearance might suggest otherwise. The biochemical cascades leading to this secondary or delayed injury are demonstrated. Drugs are available to interfere with specific pathways or steps in these biochemical cascades. The general principals of clinical trials to test the safety and efficacy of these drugs are described: Double-blind, randomized, placebo-controlled design; Entry criteria, concerning the severity of the injury, mostly based on the Glasgow Coma Scale; Outcome measurement, mostly based on the Glasgow Outcome Scale. Specific drugs and the status of their clinical trials are also described: Oxygen radical scavengers and lipid peroxidase inhibitors have failed in large scale, phase III trials; NMDA receptor antagonists are currently in phase III trials. Different types of calcium channel blockers have been tested or are ready to enter into phase III trials. Some trials with drugs with different mechanisms or trials with new management strategies (hypothermia) are also mentioned.
Author
Biochemistry; Brain Damage; Injuries; Drugs

19980003893 Institute of Neurological Sciences, Glasgow, UK

Head Protection: Motor Cyclists, Sports and Industry

Doyle, D., Institute of Neurological Sciences, UK; Sturrock, K., Institute of Neurological Sciences, UK; Nov. 1997; 8p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Protection against brain injury has been the major concern of those who have been involved in the design of head wear for participants in dangerous pursuits. Various forms of head gear have been available throughout the ages for horsemen and those concerned with military pursuits. The development of engine driven vehicles and aircraft has led to empirically designed protective hats and helmets but, relatively recently, the scientific input into the design of helmets has become more noticeable. These have led to the creation of national and international standards for the design of helmets for various activities. One of the purposes of the studies, in which we have been involved, has been the evaluation of causes of brain injuries. Looking at these, with a view to brain protection, has led to a number of observations which seem relevant to the development of protective helmets. We have had the opportunity to study accidents and injuries in pedal cyclists, motor cyclists, horse riders, vehicle occupants, pilots and industrial workers, all of which groups have had helmets specifically designed for their use. An attempt is being made to provide information on mechanisms of brain injury in humans and to provide information on the value and performance of helmets.
Author

Brain Damage; Helmets; Protection; Crash Injuries; Head (Anatomy)

19980003896 Army Aeromedical Research Lab., Fort Rucker, AL USA

US Army Aircrew Helmets: Head Injury Mitigation Technology

McEntire, B. Joseph, Army Aeromedical Research Lab., USA; Nov. 1997; 10p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Head injury remains the predominant cause of severe and fatal injuries to Army aircrew involved in helicopter mishaps. As a means to prevent injuries or reduce their severity, the U.S. Army has continuously sought improvements to aviator helmets. Numerous improvements have resulted from analysis of helmets involved in aviation accidents and the wearer's injuries. It is believed that the newest Army aviator helmet, the HGU-56/P, offers significant improvements over earlier designs. This paper presents a chronology of Army aviator helmets with descriptions defining their differences and improvements.
Author

Helmets; Impact Resistance; Crash Injuries; Product Development; Head (Anatomy)

19980003986 NERAC, Inc., Tolland, CT USA

Carpal Tunnel Syndrome and Other Repetitive Motion Disorders (Latest citations from the NTIS Bibliographic Database)

Nov. 1996; In English; Page count unavailable

Report No.(s): PB97-851224; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the prevention of carpal tunnel syndrome and other repetitive motion injuries. Citations focus on risk factors and biomechanics associated with the disorders. Ergonomics, work habits, and case studies are covered. The citations also examine Health Hazard Evaluation Reports and videos describing preventive strategies.
NTIS

Human Factors Engineering; Biodynamics; Bibliographies; Health; Signs and Symptoms; Injuries

19980004034 Madigan Army Medical Center, Takoma, WA USA

The Female Athlete Triad: Prevalence in Military Women ***Final Report, 22 Dec. 1995 - 30 Jun. 1997***

Lauder, Tamara D., Madigan Army Medical Center, USA; Jul. 1997; 38p; In English

Contract(s)/Grant(s): MIPR-96MM6637

Report No.(s): AD-A330021; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The female athlete triad, otherwise known as the inter-relatedness of disordered eating, amenorrhea, and osteoporosis, is an area of increasing awareness in female athletes, which has not been explored in military women. We conducted a 3 part prospective cross-sectional study to define the prevalence of eating disord ers, menstrual irregularities, and the full female athlete triad in military women. A total of 423 female soldiers from the general active-duty population completed Part 1 which included the Eating Disorder Inventory (EDI). Any woman meeting the screening criteria for being 'at risk' (AR) for abnormal eating behaviors underwent a clinical interview to determine whether or not they had a true eating disorder (ED). of the 423 women who participated, 33.6% (n=142) met the screening criteria for being AR for an eating disorder with 33 women (8%) actually meeting the criteria for an ED. Part 2 of the study, consisted of a clinical evaluation and laboratory studies of any woman with menstrual irregularities

(MI). Including all women, 9% had amenorrhea, 6% oligomenorrhea, and 12% had onset of menarche older than 14 years of age. Excluding all women on hormonal birth control, the prevalence dropped to 2.1%, 3.3%, and 9.2% for amenorrhea, oligomenorrhea, and menarche older than age 14 respectively. of the women not on hormonal birth control, only 1% had both an ED and MI, and 3.5% of women AR also had MI. Part 3 of the study evaluated the bone mineral density (BMD) of all women from Parts 1 and 2 using dual energy x-ray absorptiometry (DEXA). There was no significant difference between the BMD of the femoral neck or the lumbar spine of 32 eumenorrheic controls with no abnormal eating behaviors and subjects with either MI, ED, or AR alone. Looking at those women with 2 variables, no women with both an ED and MI had the full triad who were not on hormonal birth
DTIC
Athletes; Females; Osteoporosis; Lumbar Region; Bones; Order-Disorder Transformations

19980004121 Army Research Inst. of Environmental Medicine, Natick, MA USA
Human Adaptation to Hot Environments
Wenger, C. B., Army Research Inst. of Environmental Medicine, USA; Aug. 20, 1997; 80p; In English
Report No.(s): AD-A330520; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Extreme temperatures injure tissue directly. A protein's biological activity depends on the location of electrical charges in the molecule and on its overall configuration. Many physicochemical processes can alter a protein's configuration and charge distribution, and thus change its activity, without affecting the sequence of amino acids. Such alteration of a protein is called denaturation; and by inactivating a cell's proteins, denaturation injures or kills the cell. High temperature can denature proteins, and a familiar illustration of this effect is the coagulation of the albumin in the white of a cooked egg. If living tissue is heated, injury occurs at temperatures higher than about 45 deg C, which is also the temperature at which heating the skin causes pain. The degree of injury depends on both temperature and duration of the heating. As a water-based solution freezes, crystals of pure ice form. Thus all the dissolved substances are left behind in the liquid which has not yet frozen, and which becomes more and more concentrated as more ice forms. Freezing damages cells through two mechanisms. First, ice crystals themselves probably disrupt the cell membranes mechanically. Second, the increase in solute concentration of the cytoplasm as ice forms denatures the proteins by removing their water of hydration, by increasing the ionic strength of the cytoplasm, and by other changes in the physicochemical environment in the cytoplasm.
DTIC
High Temperature Environments; Human Tolerances; Adaptation; Heat Tolerance

19980004605 Pennsylvania Univ., Dept. of Neurology, Philadelphia, PA USA
Sensitivity Evaluation of Clinical Brain Metabolism ***Final Report, 1 Feb. 1992 - 31 May 1996***
Jaggi, J. L., Pennsylvania Univ., USA; Apr. 12, 1997; 8p; In English
Report No.(s): PB97-161137; R49-CCR-306290; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This project will study in acute comatose head-injury patients the true cerebral metabolic rate oxygen for development of a meaningful corrective factor which could be used for non-invasive calculation of clinical brain metabolism. Achievement of the goals could be of substantial importance in improving head injury care in providing more accurate but simple prognostic tools.
NTIS
Sensitivity; Brain; Metabolism; Injuries

19980004618 National Defence Research Establishment, Avedelningen foer NBC Skydd, Umea, Sweden
Pesticide Fire: A Human Health Hazard? Pesticides and Fire Products in Smoke
Lilliehoeoek, B., National Defence Research Establishment, Sweden; Dec. 1996; 34p; In English
Report No.(s): PB97-164800; FOA-R-96-00275-4.9-SE; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this report, the amount of burning pesticides that may remain unchanged in smoke from a fire is discussed. Furthermore, the toxicity of pesticides and smoke gases are described and how the toxicity is increased with simultaneous exposure of these chemicals. In a fire, there are different phases where the oxygen supply and the temperature are important parameters for the composition of the smoke. One conclusion is that the health hazard in this type of smoke is difficult to predict, since the fire scenario may be more important for the toxicity than the type of burning pesticides.
NTIS
Pesticides; Smoke; Combustion Products; Fires

19980004788 NERAC, Inc., Tolland, CT USA

Toxicity of Phtalates: Latest citations from the Life Sciences Collection Database

May 1997; In English; Page count unavailable, Supersedes PB96-861497.

Report No.(s): PB97-860050; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the biological effects of phtalate exposure. Measurement of phtalate levels in fish, pork, and hens is discussed. The effects of phtalates on reproductive organs, skin, lungs, liver, and blood are examined. Toxicity, carcinogenesis, and mutagenicity caused by phtalates are described. The effect of phtalates on earthworms, coral, lichen, bacteria, and mussels is briefly discussed.

NTIS

Bibliographies; Toxicity; Carcinogens; Environmental Surveys; Life Sciences; Bacteria

19980004791 Texas Univ. Health Science Center, Houston, TX USA

Gene Regions Responding to Skeletal Muscle Atrophy ***Final Report***

Booth, Frank W., Texas Univ. Health Science Center, USA; [1997]; 6p; In English

Contract(s)/Grant(s): NCC9-36

Report No.(s): NASA/CR-97-113070; NAS 1.26:113070; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Our stated specific aims for this project were: 1) Identify the region(s) of the mouse IIb myosin heavy chain (MHC) promoter necessary for in vivo expression in mouse fast-twitch muscle, and 2) Identify the region(s) of the mouse IIb MHC promoter responsive to immobilization in mouse slow-twitch muscle in vivo. We sought to address these specific aims by introducing various MHC IIb promoter/reporter gene constructs directly into the tibialis anterior and gastrocnemius muscles of living mice. Although the method of somatic gene transfer into skeletal muscle by direct injection has been successfully used in our laboratory to study the regulation of the skeletal alpha actin gene in chicken skeletal muscle, we had many difficulties utilizing this procedure in the mouse. Because of the small size of the mouse soleus and the difficulty in obtaining consistent results, we elected not to study this muscle as first proposed. Rather, our MHC IIb promoter deletion experiments were performed in the gastrocnemius. Further, we decided to use hindlimb unloading via tail suspension to induce an upregulation of the MHC IIb gene, rather than immobilization of the hindlimbs via plaster casts. This change was made because tail suspension more closely mimics spaceflight, and this procedure in our lab results in a smaller loss of overall body mass than the mouse hindlimb immobilization procedure. This suggests that the stress level during tail suspension is less than during immobilization. This research has provided an important beginning point towards understanding the molecular regulation of the MHC lIb gene in response to unweighting of skeletal muscle Future work will focus on the regulation of MHC IIb mRNA stability in response to altered loading of skeletal muscle

Derived from text

Mice; Muscles; Musculoskeletal System; Immobilization

19980005365 Army Research Lab., Soldier Performance Div., Aberdeen Proving Ground, MD USA

Load Carriage in Military Operations: A Review of Historical, Physiological, Biomechanical, and Medical Aspects

Knapik, Joseph, Army Research Lab., USA; Reynolds, Katy, Army Research Inst. of Environmental Medicine, USA; Jan. 1997; 44p; In English

Report No.(s): AD-A330082; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Because of mission requirements or the limited transportation assets of some types of units (e.g., U.S. Army light infantry), service members must often depend on their personal mobility to move individual equipment. The carrying of loads by troops is an important aspect of military operations that can become critical in some situations. Overloading with ammunition and equipment can lead to excessive fatigue and impair the ability to fight. Military historians cite numerous examples where heavy loads directly or indirectly resulted in reduced performance, unnecessary deaths, and lost battles. The purpose of this paper is to review the historical, physiological, biomechanical, and medical aspects of load carriage. Practical suggestions are offered for reducing the stress of loads on service members and for preventing and treating common load-carriage related injuries.

DTIC

Military Operations; Load Distribution (Forces); Ammunition; Human Performance

19980005565

Renal transplants in children. Experience in 225

Filippo, D., Hospital de Pediatria ‘J.P. Garrahan’, Argentina; Montverde, M.; Moguillansky, Silvia; Casalis, Claudia; Lipsich, Jose; Diaz, M.; Goldberg, Alberto; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. PEO 5503; In English; Copyright; Avail: Issuing Activity

We reviewed 225 patients transplanted (124 men, 101 women; mean age: 10.9 yrs +/- 4.59; cadaveric: 119, living related: 106; Compatibility: 3 or more math: 46%, below 3, 54%; graft survival: 1 yr: 90%/ 3 yrs 84%). US and Color Doppler were evaluated from 1990 to 1996. Fifty (22.6%) of the 225 patients had complications: Urinary 23.(10.2%), leak, reflux, ureteropelvic obstruction, ureterovesical obstruction. Vascular: 17.(7.5%) artery thrombosis, vein thrombosis, AVFs, renal artery stenosis). Lymphoceles, 3.(1.3%;). Rupture: 6.(2.6%) and one neoplastic (LH). Marked improvements in graft survival have made renal transplantation the treatment of choice for end-stage renal disease. Because of its lack of ionizing radiation and accuracy, US has had an impact on graft survival rates. Gray-scale US easily detects hydronephrosis and perinephric fluid collections. Vascular complications are readily identified by color also vascular rejection but non-medical complications and minimizes the risk of percutaneous renal biopsy and interventional procedures.
Author (EI)
Imaging Techniques; Ultrasonics; Medical Equipment; Color; Image Processing; Doppler Effect; Surgery; Transplantation

19980005566
Eight year experience in hepatic tumors at a pediatric hospital
Dardanelli, E., Hospital de Pediatria 'J.P. Garrahan', Argentina; Moguillansky, S.; Scopinaro, M.; de Davila, M. T. G.; Cuarterolo, M.; Goldberg, Alberto; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. PEO 5505; In English; Copyright; Avail: Issuing Activity

We reviewed clinical features, predisposing factors, associated findings, laboratory, imaging (US, Color Doppler and CT) and pathology in 63 hepatic mass from 1988 and 1996. Malignant: 41.(65.7%): hepatoblastoma.(HB), 25.(61%); Hepatocarcinoma.(HC), 7 (fibrolamellar 1) (17%); undifferentiated.(e) sarcoma, 8.(19.5%); angiosarcoma, 1.(2.4%). Benign: 22.(34.92): hemangioendotelioma.(HE), 14.(63.3%); mesenchymal hamartoma.(MH), 3.(13.6%); focal nodular hyperplasia.(HFN), 2.(9.09); focal regenerative hyperplasia.(HFR), 2.(9.09%); adenoma, 1.(4.5%). Clinical: abdominal mass, 79%. Age at presentation: HB x(bar) = 31 months; HCC x(bar) = 10.3 yrs, tyrosinemia excluded; sarcomas x(bar) = 7.87 yrs; hemangioendothelioma x(bar) 74.25 days. Predisposing factors: cirrhosis due to arsenicism in the angiosarcoma, type I tyrosinemia in one patient with HCC, type I glycogen storage disease in adenoma, Alagille in HFR. Associated: cutaneous hemangioma in 6/14 HE and in 2/3 MH. Laboratory: alphafetoprotein level was elevated in 87% of patients with HB. No pathognomonic imaging were observed. For vascular invasion Doppler US was more specific than CT Only tissue sampling gives the histologic type of the tumor.
Author (EI)
Imaging Techniques; Ultrasonics; Medical Equipment; Color; Image Processing; Computer Aided Tomography; Medical Science

19980005809
Radiologic imaging in the pediatric hepatic transplant. Our experience
Lipsich, J.; Questa, H.; Moguillansky, S.; Goldberg, A.; Imventarza, O.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. PEO 5504; In English; Copyright; Avail: Issuing Activity

Hepatic transplantation is being performed with increasing frequency in patients with end-stage liver disease. Radiologic imaging plays an essential role in both preoperative assessment of potential transplant candidates and postoperative evaluation of biliary, vascular, and parenchymal complications of hepatic transplantation. Eighty-four hepatic transplantation have been performed at a pediatric hospital since November 1992. This exhibit will discuss the evolving role of the radiologist in the evaluation and treatment of these patients. The value of different imaging modalities including ultrasonography, Doppler US, interventional procedures, will be emphasized.
Author (EI)
Imaging Techniques; Ultrasonics; Radiography; Radiology; Medical Science; Surgery; Transplantation

19980005810
Juvenile rheumatoid arthritis: Usefulness of color Doppler and power Doppler
Sureda, D., Hospital General Vall d'Hebron, Spain; Arnal, C.; Andreu, J.; Lopez, M.; Hidalgo, A.; Bernejo, B.; Ultrasound in Medicine and Biology; 1997; ISSN 0301-5629; Volume 23, n Suppl 1, pp. PEO 5501; In English; Copyright; Avail: Issuing Activity

To evaluate the ability of color and power Doppler to assess joint inflammation in patients with JRA of the knee. Grey-scale color and power Doppler was carried out in 154 knees of children with JRC and results were compared with those obtained in 36 healthy children. In the 36 healthy knees, no Doppler signals were detected. Color and power Doppler was intensely positive in 36 clinically-active knees with signs of activity on ultrasound (100%). of the 108 knees in clinical remission, ultrasound showed synovial thickening and small amounts of liquid in the suprapatellar bursa in 69. Color Doppler was positive in 22 and power

Doppler in 25 of them. Both color and power Doppler correlated well with inflammatory changes in the knee. Power Doppler did not improve results and showed several technical drawbacks.
Author (EI)
Imaging Techniques; Ultrasonics; Medical Equipment; Doppler Effect; Color; Image Processing; Joints (Anatomy)

19980005855 Environmental Protection Agency, Office of Research and Development, Washington, DC USA
Guidelines for Reproductive Toxicity Risk Assessment ***Final Report***
1996; 167p; In English
Report No.(s): PB97-100093; EPA/630/R-96/009A; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche
This notice describes the scientific basis for concern about exposure to agents that cause reproductive toxicity, outlines the general process for assessing potential risk to humans from exposure to environmental agents, and addresses Science Advisory Board and public comments on the 1994 Proposed Guidelines for Reproductive Toxicity Risk Assessment (PB94-155827).
NTIS
Reproduction (Biology); Toxicity; Exposure; Risk; Environment Pollution

19980006323 Army Research Inst. of Environmental Medicine, Military Performance Div., Natick, MA USA
Effects of a Specifically Designed Physical Conditioning Program on the Load Carriage and Lifting Performance of Female Soldiers
Harman, Everett, Army Research Inst. of Environmental Medicine, USA; Frykman, Peter, Army Research Inst. of Environmental Medicine, USA; Palmer, Christopher, Army Research Inst. of Environmental Medicine, USA; Lammi, Eric, Army Research Inst. of Environmental Medicine, USA; Reynolds, Katy, Army Research Inst. of Environmental Medicine, USA; Jan. 1997; 108p; In English
Report No.(s): AD-A330237; USARIEM-T98-1; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche
Forty-six women were studied to determine whether their ability to perform 'very heavy' Army jobs could be improved by a specially designed 24-week physical training program administered within normal Army time constraints; 32 subjects remained for the entire testing and training program. The training program proved effective. The weight of boxes the women could lift to three different heights improved between 30% and 47%. After training, the average box-weight the women could lift onto a truck was 118 pounds, 81% of the Army male value. The number of 40-pound boxes the women could lift onto a truck in 10 minutes increased from 106 to 140. The number of 40-pound boxes that could be lifted off the ground, carried 25 feet and placed onto a truck increased from 53 to 62. Vertical jump and standing long jump distance increased 20% and 15% respectively. The speed at which a 75 pound backpack could be carried over a 2-mile mixed-terrain course increased from 3.4 to 4.4 miles per hour. Before the training, only 24% of the women could qualify for 'very heavy' Army jobs; after the training, 78% could qualify. Body composition improved as well.
DTIC
Physical Fitness; Education; Armed Forces

53
BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

19980004509 Technische Univ., Faculty of Technical Mathematics and Informatics, Delft, Netherlands
Preferences in Perspective
Lootsma, F. A., Technische Univ., Netherlands; 1996; ISSN 0922-5641; 20p; In English
Report No.(s): PB97-208276; Rept-96-145; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche
In order to model the preferences of the decision makers in Multi-Criteria Decision Analysis (MCDA), we assume that decision are always made within a particular context. Under each criterion, we represent the context by an interval, the range of acceptable performance data on the corresponding dimension. Next, starting from a particular viewpoint we partition the range into a small number of subintervals which are subjectively equal. Several examples in planning and classification show that the gridpoints demarcating the subintervals constitute a geometric sequence with a progression factor which is roughly equal to 2. We briefly describe how these ideas have been implemented in the REMBRANDT program for MCDA.
NTIS
Decision Theory; Criteria; Classifications

54
MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.

19980003894 Army Aeromedical Research Lab., Aircrew Protection Div., Fort Rucker, AL USA
Head Injury Risk in US Army Rotary-Wing Mishaps: Changes Since 1980
Shannon, Samuel G., Army Aeromedical Research Lab., USA; Albano, John P., Army Aeromedical Research Lab., USA; Licina, Joseph R., Army Aeromedical Research Lab., USA; Nov. 1997; 10p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Over the past several decades, data have been collected on U.S. Army aircraft mishaps defining the environment within an aircraft during a mishap, injuries suffered by the occupants, and the cause (or causes) of the mishap, if known. An analysis of these data indicates 60% of the occupants are injured, one-third fatally, if the mishap concludes with the aircraft impacting the ground. More significantly, despite improvements in helicopter design, restraint systems, and personal protective equipment, 68% of all fatalities had at least one fatal injury to the head. After adjusting for differences in mishaps, including the aircraft series, and the occupant's station within the aircraft, the authors concluded that an occupant's injury risk in a helicopter mishap had decreased significantly between 1980-84 and 1990-94. One factor in this was a decline in the risk of head injury, which declined by 50%. Injury risks to the face and brain, critical anatomical regions of the head, also showed a significant decline. Risks of injury to the neck, torso, and upper extremities were not significantly different between the two time intervals. Although the authors could not identify causative factors with clear implications for preventive strategies, the proportion of new, crashworthy helicopters in the U.S. Army fleet have risen steadily since 1980 and a new flyer's helmet with improved impact protection, the SPH-4B, was fielded by the U.S. Army in the 1990's.
Author
Aircraft Accidents; Risk; Crashes; Helicopters; Crash Injuries

19980003895 Royal Air Force, School of Aviation Medicine, Farnborough, UK
Standards for Protective Helmets
Glaister, D. H., Royal Air Force, UK; Nov. 1997; 4p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A01, Hardcopy; A03, Microfiche

Undoubtedly, the protection afforded by helmets for sporting activities, the workplace and the military has improved over the years, but at a somewhat modest pace. Many published reports attest to the benefits of helmet wear in most applications, but equally show that brain damage and death can still occur despite the wearing of approved headgear, and not always under conditions of massive 'unsurvivable' impact. A better understanding of the mechanics of brain injury, the continued application of accident data, the development of more appropriate helmet test methods and the availability of new materials, together with a growing public awareness of safety, should allow the makers of standards to demand further improvements from helmet manufacturers and ensure a continuing fall in morbidity and death from head injury.
Derived from text
Helmets; Protection; Head (Anatomy); Crash Injuries; Standardization; Product Development

19980003897 Army Aeromedical Research Lab., Fort Rucker, AL USA
Mass Requirements for Helicopter Aircrew Helmets
McEntire, B. Joseph, Army Aeromedical Research Lab., USA; Shanahan, Dennis F., Army Aeromedical Research Lab., USA; Nov. 1997; 6p; In English; Also announced as 19980003879; Sponsored in part by Program Managers for Comanche; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Helicopter aircrew helmets are becoming more sophisticated with increased mission requirements. This increase results in additional mass being supported on the aircrew's head. Ultimately, there is a limit to how much mass can be supported by the aircrew without increasing the fatigue rates and neck injury risk in accidents. This paper reviews the past mass property requirements of Army helicopter helmets. Current requirements for the RAH-66 Comanche helmet are also detailed with the rationale for their derivation.
Author
Helmets; Center of Mass; Mass Distribution; Structural Design Criteria; User Requirements

19980003898 Simula, Inc., Phoenix, AZ USA

Inflatable Restraint Systems for Reducing Head Injury

Zimmermann, Richard E., Simula, Inc., USA; Yaniv, Gershon, Simula, Inc., USA; Nov. 1997; 14p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A03, Hardcopy; A03, Microfiche

Inflatable restraint systems, in the form of "air bags," are widely recognized as an effective means of reducing crash injury in automobiles. In order to provide similar crash injury protection in both commercial and military aircraft, a variety of inflatable restraint systems are now being developed. For commercial aircraft, the Passenger Air Bag System, (PABS) will provide protection for occupants in seats positioned behind bulkheads, galleys, or restrooms. The first application of PABS will be on the Jetstream J-41 aircraft. For military aircraft, a number of inflatable restraint systems are also being developed for the special conditions found in their crewstations. In addition to the Cockpit Air Bag System (CABS) that has similarities to automotive air bags, there is the Inflatable Body and Head Restraint System (IBAHRS) for use in some attack helicopters, and the Inflatable Tubular Structure (ITS) for use in small helicopters.

Author

Air Bag Restraint Devices; Crash Injuries; Protection; Head (Anatomy); Product Development

19980003899 Army Aeromedical Research Lab., Fort Rucker, AL USA

Simulations of Head Strikes in Helicopters and the Roles of Restraints, Seat Stroke and Airbags on their Reduction

Alem, Nabih M., Army Aeromedical Research Lab., USA; Beale, David G., Auburn Univ., USA; Mobasher, Amir A., Universal Energy Systems, Inc., USA; Brozoski, Frederick T., Universal Energy Systems, Inc., USA; Nov. 1997; 8p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Injuries from head strikes remain the leading cause of fatalities in U.S. Army helicopter mishaps. The roles of the restraint system, energy absorbing seat stroke and airbags in preventing or reducing the severity of head strikes are explored in this paper using mathematical simulations. Starting with a baseline simulation of an actual AH-64 survivable mishap in which the pilot received fatal basilar skull injury, the effects of three parameters were examined: timing of inertia reel locking, stroking of the energy absorbing seat, and the presence of an airbag mounted at the instrument panel. Results of the simulations suggested that delay of inertia reel in locking at the appropriate time together with obstruction of seat stroking may have caused the pilot's head to strike the glare shield. When a head strike was unavoidable, simulations indicated that an airbag would have reduced its severity.

Author

Air Bag Restraint Devices; Computerized Simulation; Crash Injuries; Damage Assessment; Physiological Effects; Biodynamics

19980003900 BTS Consulting Engineers, Windsor, Ontario Canada

Addressing Front Row HIC Requirements in Commercial Airplanes

McCarthy, J. R., BTS Consulting Engineers, Canada; Yang, K. H., Wayne State Univ., USA; Shanahan, M. T., BTS Consulting Engineers, Canada; King, A. I., Wayne State Univ., USA; Nov. 1997; 6p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Changes to the Federal Aviation Administration (FAA) regulation regarding occupant crash protection in commercial airplanes has created new design considerations for each occupant position. In particular, addressing front row seating positions to meet the head injury criteria can be a challenging design assignment involving numerous considerations. Various design approaches to meet this requirement are discussed. Particular attention is given to the articulating seat pan approach. Results of prototype testing are presented with recommendations regarding further development.

Author

Commercial Aircraft; Head (Anatomy); Protection; Impact Resistance; Seats; Dynamic Tests

19980003901 General Motors Corp., Safety Research Dept., Warren, MI USA

Investigation of Indy Car Crashes Using Impact Recorders

Melvin, J. W., General Motors Corp., USA; Baron, K. J., General Motors Corp., USA; Little, W. C., General Motors Corp., USA; Pierce, J., General Motors Motorsports, USA; Trammell, T. R., Championship Automobile Racing Teams Safety Team, USA; Nov. 1997; 20p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A03, Hardcopy; A03, Microfiche

This paper describes the initial phases of an ongoing project in the GM Motorsports Safety Technology Research Program to investigate Indy car crashes using an on-board impact recorder as the primary data collection tool. The development of a database consisting of crash investigation data patterned after national highway crash databases is discussed. The data gathered and coded includes track and incident scene information, vehicle damage, and driver injuries, as well as the vehicle decelerations measured by the impact recorder. The paper discusses the development of specifications for the impact device, the selection of the

specific recorder and its implementation on a routine basis in Indy car racing. The results from incidents that produced significant data during the 1993, 1994 and 1995 racing seasons are summarized.
Author
Data Acquisition; Data Bases; Automobile Accidents; Data Recorders; Accident Investigation; Impact Damage

19980003902 Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Crash Safety Research Center, Delft, Netherlands
Modelling Head Injury Countermeasures: A 3D Helmet Model
Brands, D. W. A., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; Thunnissen, J. G. M., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; Wismans, J. S. H. M., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; Nov. 1997; 12p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A03, Hardcopy; A03, Microfiche

A three dimensional Finite Element Model of an existing full-face motorcycle helmet mounted on a headform has been developed. Material parameters were obtained from literature data and from component tests. The model is validated by simulating impacts at different locations using the headform acceleration time histories. From this it can be concluded that the headform response is predicted in a realistic way. The simulations showed two phenomena that influence the headform response, i.e. the behaviour of the material between the headform and the point of impact, and the dynamic response of the outer regions of the outer shell. It is believed that the current model describes most of the phenomena observed during an impact and, therefore, is suitable for future optimization studies. The application of the current model is limited to impacts on a flat anvil at points in the median plane of the headform. Recommendations for further model enhancements will be presented.
Author
Dynamic Response; Helmets; Three Dimensional Models; Crash Injuries; Impact Tests; Computerized Simulation

19980003928 NERAC, Inc., Tolland, CT USA
Protective Clothing: Fire and Radiation Environments. (Latest citations from the NTIS Bibliographic Database)
Nov. 1996; In English; Page count unavailable. Supersedes PB96-855093.
Report No.(s): PB97-851703; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning clothing design, fabrication, and testing for personal protection from exposure to flames and radiation. Citations discuss the treatment of fibers and textiles, testing for physiological tolerances, and methods of decontamination after exposure. Discussed also are user acceptance and proper use of protective clothing by firefighters, nuclear energy personnel, and others.
NTIS
Radiation Protection; Bibliographies; Fire Fighting; Protective Clothing; Fabrication; Textiles; Flammability

19980003932 New York Univ. Medical Center, Occupational and Industrial Orthopaedic Center, New York, NY USA
Effect of VDT Mouse Design on Task and Musculoskeletal Performance
Barr, A. E., New York Univ. Medical Center, USA; Jan. 04, 1997; 7p; In English
Report No.(s): PB97-206239; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The effects of mouse use on the forearm and wrist were evaluated among occupational groups in a laboratory setting using pertinent musculoskeletal and skill proficiency outcome measures. An alternative mouse was designed that would reduce the risk of forearm and wrist cumulative trauma disorder (CTD). The effect of mouse design on skill acquisition and proficiency was determined in both highly skilled and novice occupational mouse users. The criteria for the design of the mouse input device were presented. The new mouse design was evaluated on the basis of task performance and motor coordination during a period of skill acquisition. The new mouse was designed so that the forearm would be maintained in a position neutral pronation/supination during mouse operation, the wrist would be maintained in a position of neutral radial/ulnar deviation during mouse operation; excursions of the mouse on the work surface would be performed by wrist flexion/extension; and the design would be appropriate for either right or left handed use. The authors note that the synchronization of both task and musculoskeletal performance outcomes permits an integrated method for evaluating computer input devices in general in a way that addresses both health and productivity issues.
NTIS
Musculoskeletal System; Human Performance; Risk; Tasks; Productivity; Forearm; Coordination; Health

19980003943 New York Univ. Medical Center, Occupational and Industrial Orthopedic Center, New York, NY USA

Effect of VDT Mouse Design on CTD Risk and User Skill

Barr, A. E., New York Univ. Medical Center, USA; Oezkaya, N., New York Univ. Medical Center, USA; Nordin, M., New York Univ. Medical Center, USA; Lee, E., New York Univ. Medical Center, USA; Dec. 16, 1996; 6p; In English

Contract(s)/Grant(s): NIOSH-R03-OH-03260

Report No.(s): PB97-206254; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Risk factors present during forearm pronated (FP) mouse use that were associated with the development of forearm and wrist cumulative trauma disorders (CTD) were investigated. A forearm neutral (FN) mouse design eliminated the postural and joint motion risk factors and reduced some of the muscular demands associated with the postural risks. An increase of 5 to 10 degrees in the grip angle of the FN mouse design was proposed so that the mean wrist deviation angle would be offset from neutral by 5 to 10 degrees of ulnar deviation, and movement would oscillate between neutral and 10 to 15 degrees of ulnar deviation. This would reduce the occurrence of high wrist radial deviation angles and lower demands on the extensor carpi radialis longus and brevis muscle, but also it may improve performance. The authors conclude that risk factors for forearm and wrist CTD are attributable to mouse operation.

NTIS

Musculoskeletal System; Wrist; Forearm; Human Factors Engineering; Computer Components

19980004511 Pennsylvania Univ., Dept. of Computer and Information Science, Philadelphia, PA USA

Jack Validation Study ***Final Report***

Azuola, Francisco, Pennsylvania Univ., USA; Badler, Norman I., Pennsylvania Univ., USA; Ho, Pei-Hwa, Pennsylvania Univ., USA; Huh, Sue-Jung, Pennsylvania Univ., USA; Kokkevis, Evangelos, Pennsylvania Univ., USA; Oct. 07, 1996; 142p; In English

Report No.(s): AD-A330143; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This document presents the details of the construction of the Jack human figure model. It explains the methods used in putting the model together, the data and references employed, as well as other related topics regarding the application of this model within the interactive 3-D environment of Jack.

DTIC

Three Dimensional Models; Human Body

19980004619 National Inst. for Occupational Safety and Health, Cincinnati, OH USA

Elements of Ergonomics Programs. A Primer Based on Workplace Evaluations of Musculoskeletal Disorders

Cohen, A. L., National Inst. for Occupational Safety and Health, USA; Gjessing, C. C., National Inst. for Occupational Safety and Health, USA; Fine, L. J., National Inst. for Occupational Safety and Health, USA; Bernard, B. P., National Inst. for Occupational Safety and Health, USA; McGlothlin, J. D., National Inst. for Occupational Safety and Health, USA; Mar. 1997; 153p; In English

Report No.(s): PB97-144901; DHHS/PUB/NIOSH-97-117; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This primer describes the basic elements of a workplace program aimed at preventing Work-related MusculoSkeletal Disorders (WMSDs). Management commitment, worker participation, and training are addressed along with procedures for identifying, evaluating, and controlling risk factors for WMSDs. The text cites NIOSH ergonomics investigations to illustrate practical ways for meeting program needs. The primer includes a 'toolbox,' which is a collection of techniques, methods, reference materials, and sources for other information that can help in program development.

NTIS

Musculoskeletal System; Human Factors Engineering; Safety Factors

19980004620 Hamilton Standard, United Technologies Corp., Windsor Locks, CT USA

Water Processor and Oxygen Generation Assembly ***Final Report***

Bedard, John, Hamilton Standard, USA; Dec. 05, 1997; 149p; In English

Contract(s)/Grant(s): NASA Order H-29387-D

Report No.(s): NASA/CR-97-206459; NAS 1.26:206459; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This report documents the results of the tasks which initiated efforts on design issues relating to the Water Processor (WP) and the Oxygen Generation Assembly (OGA) Flight Hardware for the International Space Station. This report fulfills the Statement of Work deliverables requirement for contract H-29387D. The following lists the tasks required by contract H-29387D: (1) HSSSI shall coordinate a detailed review of WP/OGA Flight Hardware program requirements with personnel from MSFC to identify requirements that can be eliminated without affecting the technical integrity of the WP/OGA Hardware; (2) HSSSI shall con-

duct the technical interchanges with personnel from MSFC to resolve design issues related to WP/OGA Flight Hardware; (3) HSSSI will initiate discussions with Zellwegger Analytics, Inc. to address design issues related to WP and PCWQM interfaces. Derived from text

Spacecraft Equipment; Oxygen Production; Water Treatment; International Space Station; NASA Programs

19980004689 Squeegee Plus Co., Eugene, OR USA

Effect of Squeegee Design on Carpal Tunnel Pressure ***Final Report, 30 Sep. 1995 - 31 Mar. 1996***

Musser, W. H., Squeegee Plus Co., USA; Coulson, C., Squeegee Plus Co., USA; Jul. 23, 1996; 98p; In English

Contract(s)/Grant(s): NIH-1-R43-OH-03357-01

Report No.(s): PB97-162358; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

A multitask study was conducted in an effort to examine the relationship between squeegee handle designs and their potential impact on carpal tunnel syndrome and other cumulative trauma disorders (CTDs). The study group was composed of screen print workers. Two important factors in determining perceived confort and exertion during the hands on evaluation were handle shape and width. The best performing handle made full contact with the fingers and the palmar surface of the hand with the hand in a somewhat open and relaxed position. The grip was also wider than the industry standard handle. There were 42 participants who had used padded handles; 60% indicated a marked decrease in hand fatigue and 55% indicated a marked decrease in hand pain. A mean carpal tunnel pressure value was calculated for each subject using each squeegee handle. There was a trend for the ergonomic handle designs to reduce carpal tunnel pressure relative to the industry standard design. The authors conclude that an ergonomically shaped squeegee handle with a relatively wide grip may increase comfort and decrease CTDs.

NTIS

Fingers; Handles; Pressure Reduction; Physical Work; Industries

19980004692 NERAC, Inc., Tolland, CT USA

Dehumidifiers: Latest citations from the US Patent Bibliographic File with Exemplary Claims

May 1997; In English

Report No.(s): PB97-860167; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning industrial and commercial dehumidifiers. Applications discussed include dehumidifiers used for image forming devices, food storage devices, cryogenic refrigeration systems, patient ventilators, and pollution removal systems. Ultra-high energy efficient and portable dehumidifiers are briefly investigated.

NTIS

Bibliographies; Dehumidification; Air Conditioning Equipment; Cryogenic Cooling

19980005009 Sustainable Design Group, Inc., Gaithersburg, MD USA

ASHRAE 62-1989 Compliance in a Retail Store Using Desiccant Systems ***Final Report, Jul. 1995 - Aug. 1996***

Spears, J. W., Sustainable Design Group, Inc., USA; Judge, J., Sustainable Design Group, Inc., USA; Feb. 1997; 55p; In English

Contract(s)/Grant(s): GRI-5091-246-2318

Report No.(s): PB97-171631; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This 14-month field monitoring study documented the technical and economic viability of integrating desiccant dehumidification units into a retail store's HVAC system to condition all outside ventilation air requirements of ASHRAE Standard 62-1989. This report summarizes HVAC equipment and building performance criteria for two nearly identical Wal-Mart Supercenters located in Norfolk and Fremont, Nebraska. At the test-site Norfolk facility, two Munters DryCool desiccant units treated all outside air while standard gas-electric rooftop units conditioned re-circulated air only. The standard-design Fremont location served as the control store, where rooftop units treated outside and re-circulated air. Comparative measurements included total-, latent- and sensible-cooling loads, consistency and comfort of store conditions, ventilation air conditions and quantities, gas and electric energy consumption, and a variety of HVAC equipment performance measurements. Data analysis confirmed that integration of desiccant air handlers into store HVAC design improves store conditions, provides greater flexibility to match equipment to loads, lowers operating costs and presents the potential for first-cost savings.

NTIS

Desiccants; Dehumidification; Space Heating (Buildings); Air Conditioning

19980005368 Stanford Univ., Dept. of Electrical Engineering, Stanford, CA USA

ONR Annual Review 1997. Tactile Sensing and Information Processing for Man and Machine Systems ***Annual Report***

Cutkosky, M. R., Stanford Univ., USA; Kovacs, Gregory, Stanford Univ., USA; Howe, Robert, Harvard Univ., USA; Brockett, Roger, Harvard Univ., USA; Sep. 1997; 14p; In English

Contract(s)/Grant(s): N00014-92-J-1887

Report No.(s): AD-A329927; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Haptic interfaces, that apply forces to the fingertips of a human operator, can be classified as grounded or ungrounded. Grounded devices, such as SensAble Devices' Phantom or Immersion's Impulse Engine, are attached to a stationary object such as a desk. When the operator touches a virtual wall, a contact force is applied through the interface, inhibiting further motion. For ungrounded devices a contact force is felt but there is no impediment to motion of the arm. Little prior research has been done on the perceptual effects of displaying contacts with virtual objects using an ungrounded haptic interface. Experiments were conducted at Stanford to compare how accurately subjects could identify contacts with virtual walls using ungrounded versus grounded feedback. Two haptic interfaces were constructed and operated in three modes: with grounded force feedback applied to the wrist, with ungrounded forces applied to the fingertips, and with grounded wrist forces in addition to fingertip forces. Tests were conducted to see how quickly subjects could arrest motion upon sensing contact (measured as virtual boundary penetration) and how accurately they could distinguish among objects of different size.

DTIC

Visual Perception; Man Machine Systems; Virtual Reality

19980005631 Michigan Univ., Center for Construction Engineering and Management, Ann Arbor, MI USA

Ergonomic Analysis of Construction Tasks for Risk Factors for Overexertion Injuries ***Final Report***

Everett, J. G., Michigan Univ., USA; May 06, 1997; 150p; In English

Report No.(s): PB97-207179; UMCEE-TR-96-27; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Overexertion injuries are the single largest classification of injury in construction, accouting for about 24% of all injuries. Overexertion injuries generally occur as a result of performing a given task as planned. While overexertion injuries are not intentional, the underlying causes of the injuries are built into the prescribed tools and work methods. If the causes can be identified, it should be possible to engineer them out of the work. The objectives of this project are to develop a catalog of construction tasks and to analyze each task as a whole and each step of each task for the presence of seven generic risk factors for overexertion injuries: repetitive exertions, static exertions, forceful exertions, localized mechanical stresses, posture stresses, low temperature, and vibration. Ratings for each risk factor have been made on a three point scale: 1 = insignificant, 2 = moderate, and 3 = high. Virtually every activity has at least one risk factor with a score of 3. of the sixty-five activities, fifty-three has at least one constituent task with at least two risk factors with scores of 3.

NTIS

Physical Work; Injuries; Risk; Industrial Safety; Human Factors Engineering

19980005665 Battelle Memorial Inst., Columbus, OH USA

Maintenance Hazard Simulation: A Study of Contributing Factors ***Final Report, Nov. 1995 - Oct. 1996***

Ianni, John, Armstrong Lab., USA; Clark, Kirby, Battelle Memorial Inst., USA; Blaney, Lynnette, Battelle Memorial Inst., USA; Hale, Robert, Battelle Memorial Inst., USA; Ziolek, Scott, Computer Sciences Corp., USA; Bridgman, Thomas, Computer Sciences Corp., USA; Jan. 1997; 14p; In English

Contract(s)/Grant(s): F33657-91-C-0001; AF Proj. 2940

Report No.(s): AD-A329627; AL/HR-TP-1966-0044; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

This paper develops a foundation for the representation of hazardous conditions for animated maintenance simulation. Specifically, the objective of this study was to furnish methods to calculate and display hazard thresholds in a simulation system called DEPTH (Design, Evaluation for Personnel, Training, and Human Factors). DEPTH allows maintenance procedures to be graphically simulated using three dimensional Human Figure Models (HFM) and computer aided design geometry. by integrating existing equations and data to generate hazardous regions, DEPTH will be able to indicate when a human figure comes too close to an 'unsafe' object. Once the capability is incorporated in DEPTH, it will be possible to develop safer weapon systems and maintenance procedures. This study focused on radiant and contact properties of objects including operating temperature, voltage, and noise as opposed to ambient factors such as arctic or tropical conditions.

DTIC

Hazards; Human Factors Engineering; Electric Potential; Systems Engineering; Safety; Computer Aided Design; Maintenance Training

19980005709 NERAC, Inc., Tolland, CT USA

Protective Clothing: Survival, Aircraft, and Combat Environments (Latest citations from the NTIS Bibliographic Database)

May 1996; In English; Page count unavailable

Report No.(s): PB96-870688; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning design, testing, and evaluation of protective apparel for military and other non-commercial pilots. The citations focus on clothing appropriate to varying climatic and gravitational conditions, combat conditions, and special circumstances of exposure and survival, such as the ocean environment.

NTIS

Bibliographies; Protective Clothing; Flight Clothing; Design Analysis; Performance Tests; Evaluation

Subject Term Index

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Report Documentation Page

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